A CHILTON PUBLICATION

The Iron Age

THE NATIONAL METALWORKING WEEKLY November 27, 1952

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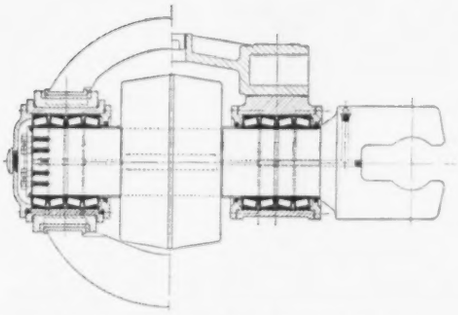
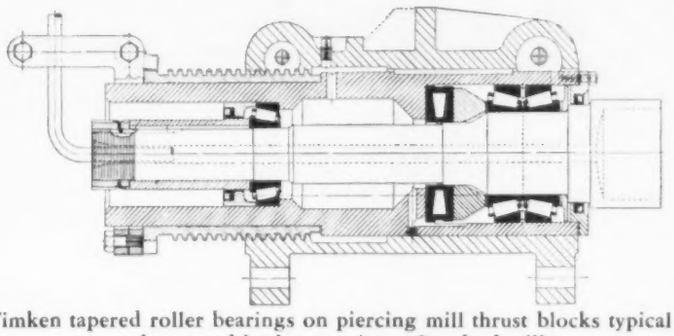
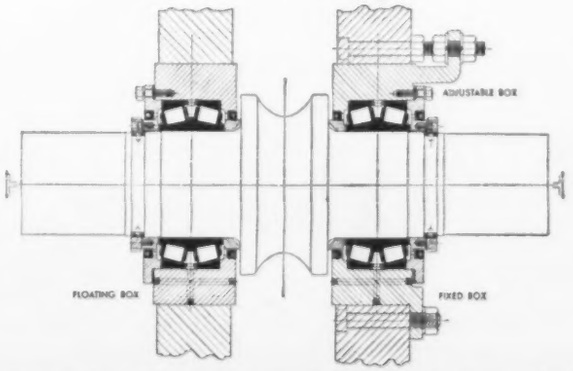
1,111 TIMKEN® bearings to help new Aetna-Standard tube mill boost production



How Timken tapered roller bearings are mounted on main roll necks of a typical Aetna-Standard piercing mill.



Timken tapered roller bearings on piercing mill thrust blocks typical of those used in the new Aetna-Standard mill.



A typical mounting of Timken tapered roller bearings on reducing and sizing mill roll necks.

ANOTHER new seamless tube mill, now being built by the Aetna-Standard Engineering Company for The Colorado Fuel and Iron Corporation, Pueblo, Colorado, will do its job on Timken® bearings. Aetna-Standard knows from experience that Timken bearings on mills like this insure higher speeds, longer life and minimum time-outs for maintenance and repairs. That's why a total of 1,111 Timken bearings are being used on the new mill's roll necks, drives, thrust blocks, and troughing tables.

Today, it is estimated that 95% of America's seamless tubing is produced on mills equipped with Timken bearings. Over 50 years of bearing research and development have made Timken bearings the number one choice of industry. Specify them for the machines you build. Look for them in the machines you buy. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

Here's where the 1,111 Timken bearings are used in the new Aetna-Standard seamless tube mill:

Two 36" piercing mills . . .	50
24" plug mill	8
Two 30" reelers.	26
14-stand 16½" reducing mill.	262
7-stand 20" sizing mill. . . .	192
3-stand 20" sizing mill. . . .	24
Troughing table rollers . . .	549
Total Timken Bearings. . .	1,111

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊕ AND THRUST —⊕— LOADS OR ANY COMBINATION —⊕—

Punch press builder insures good lubrication with Farval

ON this Warco press, there are no grease cups. Nothing is left to the judgment of the man with an oil can. The machine is protected by a Farval Centralized System of Lubrication.

Farval makes it routine to see that every bearing regularly gets the exact, measured amount of lubricant it requires. Each work shift, a few strokes of a hand pump lever provide adequate lubrication and keep the press running at top efficiency.

With Farval, special oilers are not needed, lubricant consumption is reduced, bearing life is extended materially and shutdowns for oiling or bearing replacement are eliminated. In short, with Farval on the job, the purchaser of a Warco press is insured of getting all the value built into the machine by its manufacturer.

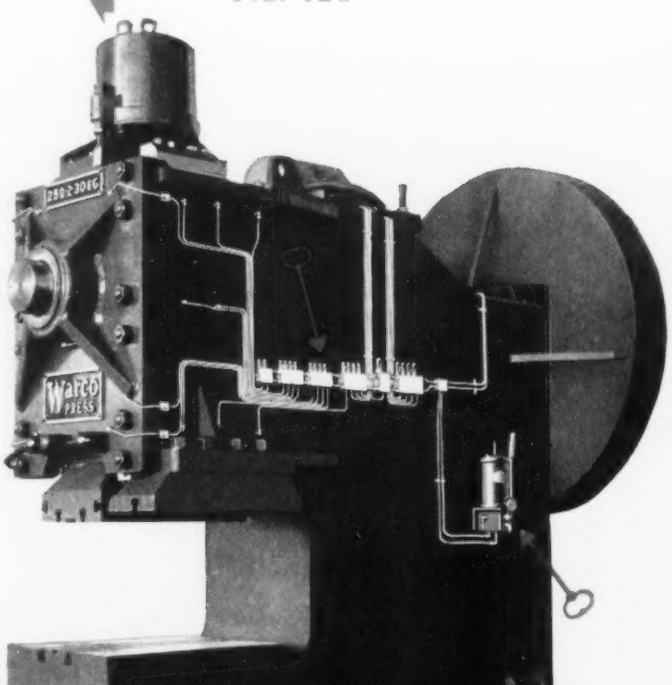
Farval is the original Dualine system of centralized lubrication for industrial equipment, proved practical in 25 years of service. The Farval valve has only two moving parts — is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, the Farval system unfailingly delivers oil or grease to each bearing—as much as you want, exactly measured—as often as desired. Indicators at all bearings show that each valve has functioned.

In or near your city there's a Farval engineer, ready to discuss your lubrication problems and suggest a proper system to meet your particular needs.

The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

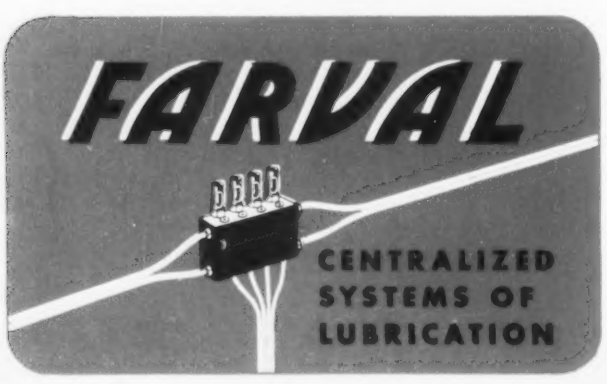
Affiliate of The Cleveland Worm and Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

FARVAL—*Studies in Centralized Lubrication* No. 126



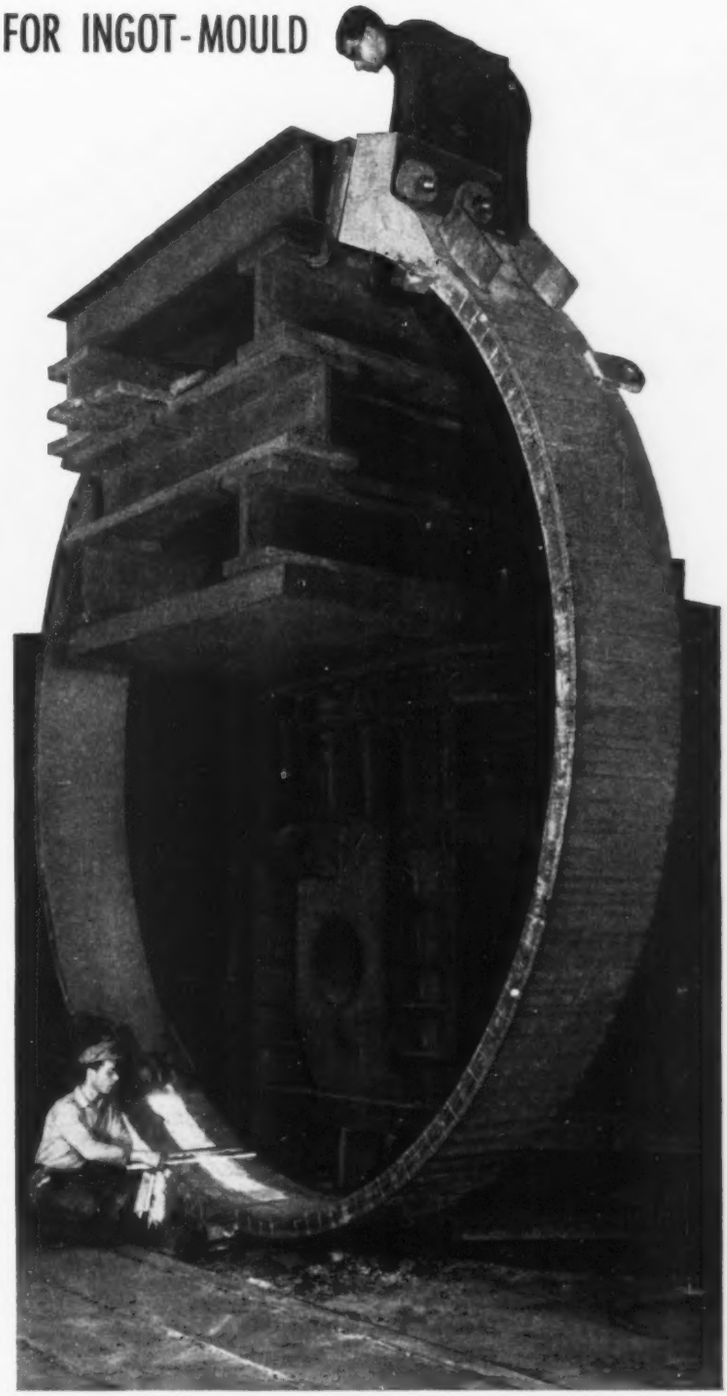
KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine will be properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

Photo above by courtesy Federal Machine and Welder Co.



18,000-lb Mould-Band Made by Welding

FABRICATED IN TWO SECTIONS FOR INGOT-MOULD



This giant ring of steel, weighing approximately 9 tons, is one of three identical mould-bands, made recently for use in a 134-in. ingot-mould. Each band is 15 ft, 4 in. in outside diameter, 22 in. wide, and 4 in. thick. The end lugs are of forged steel. The bands were fabricated in halves. Welding was done in Bethlehem's Weldments Shop.

Practically any type of mould, press, machine or machine part can be made economically by using Bethlehem Weldments. They eliminate excess weight, without sacrifice in rigidity, often leading to reduction in cost of manufacture. Besides, these weldments are extremely versatile, as they can be produced in a wide range of sizes, either as simple parts or intricate assemblies.

Bethlehem Weldments offer full freedom in product design, because the steel from which they are made can be bent, pressed or otherwise shaped prior to welding, without harm to its physical structure. They can also be combined effectively with forgings or castings.

Perhaps you could use Bethlehem Weldments advantageously. Why not talk it over? Write to the nearest Bethlehem office, and we'll arrange for a Bethlehem representative to see you at your convenience.

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BETHLEHEM, PA.

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BETHLEHEM STEEL

BETHLEHEM WELDMENTS

The Iron Age

Vol. 170, No. 22, November 27, 1952

* Starred items are digested on opposite page.

EDITORIAL

NEWS OF INDUSTRY

NEWS ANALYSIS

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THE IRON AGE, published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries, $15, other Foreign Countries, $25 per year. Single copies, 35c. Annual Review and Metal Industry Facts Issue, $2.00. Cables: "Ironage," N. Y.

DIGEST of

NEWS DEVELOPMENTS

DO YOU FAVOR HIGH OR LOW TARIFF RATE?—P. 37
Whether an industry is for or against tariffs depends on what products it makes, how it makes them, and where they are sold. Now that the Republican Congress must act on extending the tariff act next year industry had better prepare to make its views felt. Issues will be "adequate" against low duties.

WELDED ALUMINUM PIPE MADE IN QUANTITY—P. 40
Aluminum strip is welded into 3-in. irrigation pipe on commercial basis. Patents pending on process for automatically arc-welding tubing from strip in inert atmosphere. Nearly 3 years of development pays off as product acceptance grows. Four-fold expansion under way by Aluminum Supply Co.

SHIPYARD BUILDS PLANETARIUM PROJECTOR—P. 41
First planetarium projector built in U.S. made by Bethlehem Pacific's San Francisco Shipyard. Some parts of the projector had to be machined within tolerances of 0.001. Work included machining surfaces of two spherical star projector carriers and boring 15 9-in. holes in each.

DIRECT REDUCTION GIVES HIGH PURITY IRON—P. 43
Test heats of direct-reduced iron result in average purity of 99.94575 pct Fe. Aim of Arata Metallurgy was to determine commercial feasibility of electric-arc furnace process. Magnetite concentrates analyzing 57 to 71 pct Fe were used. Even higher purity may be made. Military, electronic uses seen.

STEEL CAPACITY UPPED 7.2 MILLION TONS—P. 44
By the end of the year, U.S. steel mills will have installed 7.2 million tons of new ingot capacity. Total capacity in '53 will be about 116 million tons, not far from 120-million ton goal established last year. Midwest and East lead in steel expansion. New facilities may speed scuttling of CMP.

ARE THERE ENOUGH GAGES TO GO AROUND?—P. 65
With machine tool shipments steadily rising and cutting tool requirements being filled, it now appears there may not be enough gages to make ends meet. Ways of meeting stronger market demand for gages are a prime concern of industry and government. NPA gets ready to recommend gage expansion.

the Week in Metalworking

ENGINEERING & PRODUCTION

TREND TO BASIC ELECTRIC ARC PRACTICE—P. 103
A survey of 25 foundries, representing about 75 pct of the total using basic electric arc furnaces for melting ferritic steels, shows the trends and significant differences in melting practice. Without high grade scrap in many areas the trend is away from acid electric furnace practice.

AUTOMATION IS PRACTICAL FOR FORGE SHOPS—P. 106
Automation is just around the corner for forge shops—large and small. Plants once stymied by the limits of operator skill and lack of fast heating equipment, now have new, faster production methods available. Higher output per man hour, improved quality and lower costs are tangible results.

P CHART USED WITH RATIO-DELAY TECHNIQUES—P. 110
If you use ratio-delay techniques for establishing downtime percentages, you can get more accurate results with this simple method. The p chart has been adopted for use with ratio-delay techniques. Result is an improved statistical method for determining downtime and more accurate data.

CARBIDE HAMMERS CUT PULVERIZING COSTS—P. 114
Hammers of pulverizing mills last up to 100 times longer when tipped with tungsten carbide. Overall hammer length, essential to mill efficiency, is maintained for longer periods. Cost for replacement of hammers has been reduced while repair and maintenance downtimes have been minimized.

BAR POINTER RAISES COIL SPRING OUTPUT—P. 120
Addition of a comparatively simple mechanical bar handling and roll feeding device has increased production and cut rejects of pointed steel bars for coil springs in Chrysler-made cars. In addition to providing relief from a monotonous, fatiguing job, the device has improved quality control.

MAGNESIUM FINISHES FOR AIRCRAFT USE—NEXT WEEK
A project was undertaken by Northrup Aircraft, Inc. to evaluate magnesium finishes for production applications. Numerous finishes much better than those used in current aircraft production were developed. The average vinyl-base finish offered better means of corrosion protection.

MARKETS & PRICES

WAREHOUSE CAPACITY EXPANDS WITH STEEL—P. 39
Growth of warehouse industry matches higher steel needs. Lack of personnel and working capital plus short steel inventories are the main stumbling blocks with emphasis on stocks. But warehousemen are confident of continued good business. Planning extends to 1955 and beyond. All factors considered.

STEEL INDUSTRY TASK FORCE ASKS CMP END—P. 49
The steel industry has asked National Production Authority to scrap all Controlled Materials Plan regulations except for military and atomic energy priorities by April 1. But retention of production directives was recommended to assure meeting defense production needs in tight categories of steel products.

AUTOMOTIVE SALES DROP BUT PROFITS MOUNT—P. 54
Despite lower sales automotive profits for the first 9 months of 1952 were generally higher than in '51. Trend to increased earnings in spite of lowered sales is due mainly to easing of price controls. Another factor is lessened use of conversion steel, although the steel strike increased use temporarily.

WILL THE GOVERNMENT GIVE UP BUSINESS?—P. 59
Support for proposals that the government give up some of its business ventures is growing. Need for new sources of revenue is main reason these proposals may succeed. GE's Charles Wilson predicts sale of government dams, generating equipment and distribution facilities would cut national debt 10 pct.

DECONTROL TIMETABLE BEGINS TO TAKE SHAPE—P. 127
Steel industry task force recommendations for decontrol are backed by a market forecast that makes these points: Production next year can be as high as 118.8 million net tons—if needed. No more than 14 million tons will be needed for military, atomic uses. This leaves up to 104 million tons for others.

LEAD DECLINES FOLLOWING LONDON PRICE—P. 130
British lead market is still leading the U. S. price around regardless of market strength here. First dip of the month caused by London weakness, others may follow. Zinc is still the same but what happens next year will probably be determined in London where private trade will soon be resumed.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Where B.F.Goodrich grommet belts have outlasted others 8 to 1

B. F. Goodrich grommet V belts cut costs 20 to 50%

EACH time this machine is started the belts that drive it take a beating. The shock, combined with the heavy pulling load and high speed, caused the first set of V belts used on this drive to fail in only 6 months. Something exceptional was needed, so B. F. Goodrich grommet V belts were installed. That was over 4 years ago, and they're still in use. In fact, the company superintendent says it looks as though this same set of grommet V belts will operate another 10 years. Here's why B. F. Goodrich grommet belts outperform ordinary belts:

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. There are no layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced. And grommet V belts stretch less — only 1/3 as much, on an average, as ordinary V belts.

Better grip, less slip — Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give 1/3 more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

They cost no more — Grommet V belts cut costs because they last longer, increase production because machines keep running with fewer interruptions, reduce maintenance costs because they need less attention, yet they cost not one cent more. Available in C, D, and E sections. But remember, only B. F. Goodrich makes the grommet V belt (U. S. Patent No. 2,233,294), so to get all these savings, call in your local BFG distributor the next time you need V belts, or write *The B.F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.* (Available in Canada)

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B.F.Goodrich
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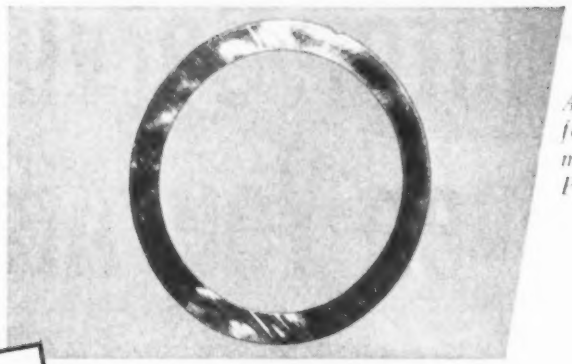
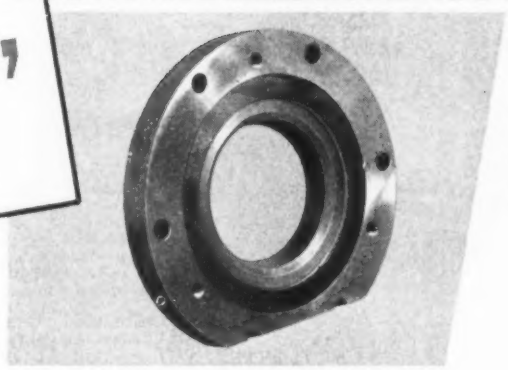


A ring-plate type valve for freon compressor made of Armco 17-7 PH Stainless Steel strip.

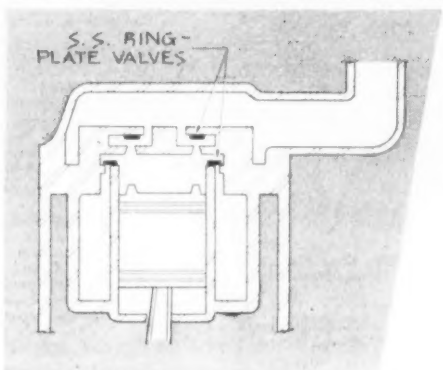
"17-7 PH"



Here is how the ring-plate type valve is mounted and held in its retaining plate.

Replaces Carbon Steel In These

Ring-Plate Valves



This is the way the simple and efficient ring-plate valves operate in the compressor.

In a well-known line of freon compressors, Armco 17-7 PH Stainless Steel has proved its superiority for ring-plate valves and now replaces the carbon steel formerly used.

For these rings Armco 17-7 PH strip, 0.040-inch thick, is purchased in the cold-worked condition. After blanking, only a single low-temperature heat treatment is required for the desired hardness, since cold-working has already transformed the material. Resulting yield and tensile strengths are very high.

This is another case where physical characteristics and low-temperature heat treatment of this precipitation-hardening stainless steel produce a better product in fewer operations. Line check-valve plates and pump-valve discs are among other related applications that have been found most successful

Two PH Grades

Armco 17-7 PH is made in sheets, strip, plates, bars and wire. Single and double low-temperature heat treatments are employed in hardening. There is also a special bar and wire grade, Armco 17-4 PH, that requires only a single low-temperature heat treatment. If you need good corrosion resistance and high strength combined with ready workability, investigate these two Armco Precipitation-Hardening Stainless Steels. Just a post card will bring you complete information.

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Let's Nail It Down

"IT should be noticed we gain nothing with Russia by conciliation or concession." These words were spoken 76 years ago by one of Britain's most brilliant Prime Ministers. They sum up our experience with Russia and Red China today.

Contrast them with the statement of Britain's Foreign Secretary Eden—made last week—that it is not necessary to "nail down" details on India's Korean resolution. America has learned by bitter experience that it is necessary to "nail down" all details before negotiating with the Communists.

Our government has not always been aware of the need for that simple but stark attitude. At Yalta, at Teheran and in Korea many details were not nailed down—much to the sorrow of American, Chinese and Korean people. Now is as good a time as any to tell the world that nailing things down is our policy.

With strong and experienced men joining Mr. Eisenhower's cabinet it is clear that "diplomatic" conciliation and concession at home and abroad are on their way out. People are sick and tired of pussyfoot diplomacy. It has gotten us nowhere.

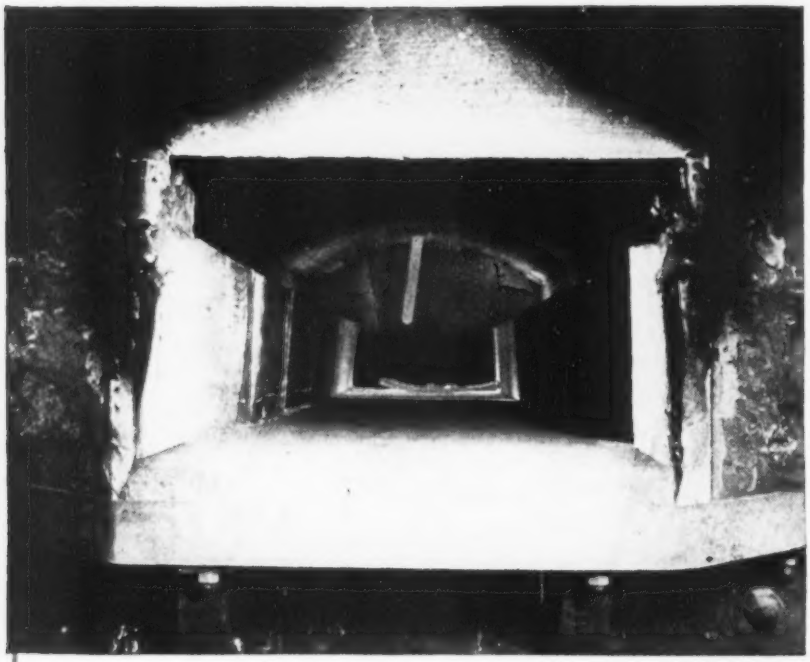
Communists think nothing of dying for an idea—regardless of its depravity. Russians have always been firm believers that the end justifies the means. To this national inheritance Stalin has added the poison of communism. Together they make a combination that is hard to beat—and almost incomprehensible to Western Europeans and Americans.

The free world is not playing for marbles. We are players in a gigantic game where it is all or nothing. Conciliation, concession and appeasement are looked upon by Russia and Red China as weakness—and a gain for them when we are on the giving side. If we, or any other free nation, assume that Communists will act according to our rules we are in for one after another heart-rending defeat.

The new Administration will be content with nothing less than having things nailed down. That attitude is a must in a world where simple words have to be backed up with the will power to make them stick.

Tom Campbell

Editor



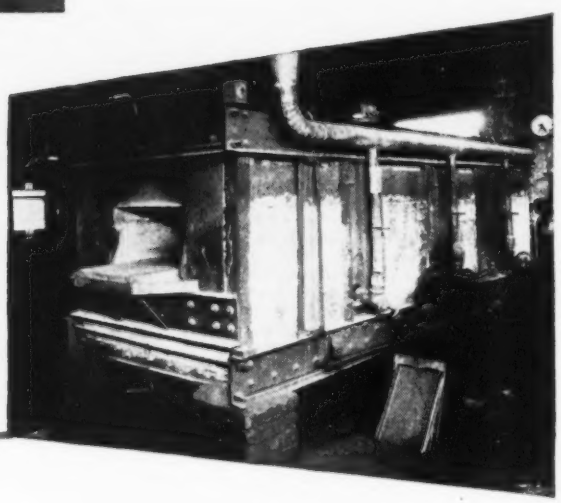
Here's how the CARBOFRAX hearth and side baffles looked after 15 months service — practically like new. Since silicon carbide is among the hardest of man made products, a hearth like this can take even the toughest abrasive wear and show hardly any signs of it.

This pusher-type, semi-muffle furnace is used for general heat treating. It is oil fired, operates 5 days a week at temperatures from 1350 F to 2100 F. Alloy trays carry the small parts, larger castings (up to 30 lbs) rest directly on the hearth.

In one year

CARBOFRAX *refractories*

saved over 30 days downtime



This same heat-treating furnace was able to turn out far more work, with far fewer shutdowns, simply by changing from one type of refractory to another. Originally equipped with 4″ thick fireclay floor and side baffles, the output of this furnace was 6 tons a day (8-hr). At best, furnace efficiency was low, and there was rapid wear on the hearth caused by unevenly shaped castings being treated. Every month, a 2 to 3 day shutdown was required for refractory repairs. And 2 or 3 times each year, the hearth would be beyond repair and need complete replacement.

Then, CARBOFRAX silicon carbide refractories replaced the clay. Because they could be made thinner and because of their far greater thermal efficiency (CARBOFRAX refractories conduct heat 11 to 12 times faster than fireclay), furnace output immediately jumped from 12,000 to 15,000 lbs a day. *A gain of one full day's production every 4 days.*

As for refractory maintenance, it all but ceased. 18 months after installation the CARBOFRAX hearth was in perfect condition, still hard and true. Maintenance up to this time: ZERO.

In other words, after 18 months the CARBOFRAX hearth had not only outlasted 3 fireclay hearths, but saved roughly 45 days of downtime. Plus the labor. Plus the materials. Plus the lost production. And, it was still in excellent condition, still helping to deliver an extra 7½ tons of work per week, every week.

To find how these refractories can benefit *your* furnaces simply write to Department B-112, Refractories Division, The Carborundum Company, Perth Amboy, New Jersey.

Use Super Refractories by

CARBORUNDUM

Trade Mark

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company.

Dear Editor:

Letters from readers

"A Businessman's Creed"

Sir:

I have no difficulty whatever in subscribing to the creed . . .

E. G. GRACE
Chairman

Bethlehem Steel Co., Inc.
Bethlehem

Sir:

I have taken the pledge to "A Businessman's Creed" so ably presented in your editorial, Nov. 13 issue.

J. SOMERS
President

Wyckoff Steel Co.
Pittsburgh

Sir:

This is just 1000 pct right. I believe in it and will follow it.

C. M. WHITE
President

Republic Steel Corp.
Cleveland

The Customer Again

Sir:

We were very much impressed with the editorial, "The Customer Is Back," in your Nov. 6 issue.

We would like very much to have 20 tear sheets of this so that we could distribute them through our staff.

J. K. NOEL
President

Victor Products Corp.
Ranson, W. Va.

Satisfied Reader

Sir:

Several months ago I wrote to you pointing out certain problems that I had in reading THE IRON AGE Newsfront . . . I have been gratified to find, that from my standpoint, at least, a tremendous improvement has been made . . . I find it very much easier to keep my thoughts in line as I read it and, needless to say, enjoy it very much more. Congratulations on a fine job.

JOHN L. FULLER
Manager of Research

The Reliance Electric & Engineering Co.
Cleveland

Our thanks go to Mr. Fuller and to readers like him who take the time to pass along their ideas for improving the readability of The Iron Age.—Ed.

Push-Buttons

Sir:

Please send us 2 copies of your article "Coal: Mining by Push-Buttons" which appeared in the Nov. 6 issue.

MARVIN C. MOFFETT
Manager

Moffett Mfg. Co.
Coatesville, Penna.

Shell Molding

Sir:

In the Nov. 6 issue there is a listing of the high spots of the Metal Show held in Philadelphia last month.

On this list is mentioned a 12-station automatic shell molding machine capable of producing 700 molds per hr.

Will you send me the name of the company so that I may request information from them direct.

H. L. BOUWKAMP
Chief Manufacturing Engineer

American Seating Co.
Grand Rapids

The 12-station automatic shell molding machine is made by Mechanical Handling Systems, Inc., Detroit.—Ed.

Bombs Away!

Sir:

In your issue of October 16 you had a small article headed "Bombings—Plants Are Still There." I clipped this and sent it to an engineer who has had very extensive experience in the investigation of bomb damage in Germany, England and Japan, and who has witnessed and has information concerning the atomic tests in the desert and Pacific Islands. I think you will be interested in his reply which follows:

"The clipping from THE IRON AGE hits an all time high for misinformation and prejudiced line of reasoning. This is the sort of text one does not expect from a reputable industrial magazine. The U. S. Strategic Bombing Survey Publications are available and contain a detailed report by trusted representatives of the steel industry. Their conclusions are diametrically opposed to your aticle."

S. M. MARSHALL
Consulting Engineer

Stewart M. Marshall
Palo Alto, Calif.

There seems to be a sharp difference of opinion between the letter above and one of the top Washington people responsible for the publication of the U. S. Strategic Bombing Survey. Iron Age's authority, who verified the story in the first place, was in military service during World War II behind enemy lines. He was later associated with Intelligence in a top-echelon post. He says news that the Air Force did not win the war single-handedly may be unpleasant to some Air Force enthusiasts—but it is nevertheless true. Now in an important government position, here is what he has to say about the authenticity of the Iron Age story which dealt mainly with the German steel industry and other heavy fabricating plants:

"The story is excellent. The facts are correct. The 2.5 pct figure of bombing damage has either hit it on the nose or is very close to it. Rust caused far more damage to steel mill equipment than bombs did. What you say about industry becoming more aware of the great dangers resulting from A-bombs is the truest thing in the world. There is too much complacency. People tend to think of a future war in terms of the last war."—Ed.

Fatigue Cracks

by William M. Coffey

Donnez-moi la plume—Voltaire

We quote from Stevenson: "We know nothing about writing a column; if told to do it, we'll lock ourselves in the bathroom; if made to do it, we'll keep the water running." This is our fifth Fatigue Crack. We started off poorly and have developed progressively worse. We thought last week's pitiful display would surely ease us off the spot. But no word *yet* from the front office. We're making certain this week, however. We call your attention to the following jokes:

1. A friend whose wife gave birth to twins was asked, "Boys or girls?" "I think one is a girl and one is a boy," the bewildered father answered, "but maybe it's the other way around."

2. Drunk: What's that crawling up the wall?
Bartender: A lady bug.
Drunk: Gad, what eyesight.

We challenge anybody to come up with jokes that have so much wince-appeal. If you have any send them along. Maybe yours can get us fired. As Molière said—*Le crayon est sur le table.*

And Now . . .

. . . we're going to put in a deserved plug for your f.f.j. We're not paid, you know, to sit around here and just tell jokes, no matter how new they are. We're going to talk about the Statistical Steel Facts Section that will be a part of the giant Annual Review Issue coming in January. This is the famous section that gives you so many handy facts and figures on metals, raw materials, machinery, markets, etc. A tour of the editorial department where this is being put together would show you some of our best men quietly going mad.

Eight different editors, plus artists, production men, printers, statisticians all have a hand in it. Old figures are being checked against new data; the latest information is being obtained from scores of different sources—trade associations, government agencies, our own research department. Many of the figures are coming from our own mail and phone surveys.

This whole process started six months ago and the by-word is ACCURACY. Progress charts line the walls, phones are constantly ringing, teletype machines are working 24 hours a day. As press-time approaches the tension mounts. An occasional scream is heard over the usual editorial din. Cigarette butts are hourly swept away by a picked squad of janitorial specialists. Ambulances are on the alert. How is it really done? We don't know, but somehow blue sky appears, order emerges and 700 sets of figures in 350 separate tables are packed into 96 pages of the Annual and on the way to you. It's a tremendous job. You'll find it of lasting, usable value. *Quelle heure est-il?*—Zola.

Reader Service Department

Thank you for your inquiry, Mrs. Vogel (Bridgeport, Conn.). The annual review issue will be 1" thick. If placed under the *shortest* leg of your kitchen table it should certainly take care of that nasty wobble. Suggest you ask Mr. Vogel first, however.

Puzzlers

Typical of many letters received from puzzle fans is this one from Jack Weiller of U. S. Steel, Chicago. He says, "Please send the solution to the 12 silver dollars puzzle before we beat our brains out." To all who have voiced like frustration we say, "At ease! The answer has been dittoed and is in the mail."

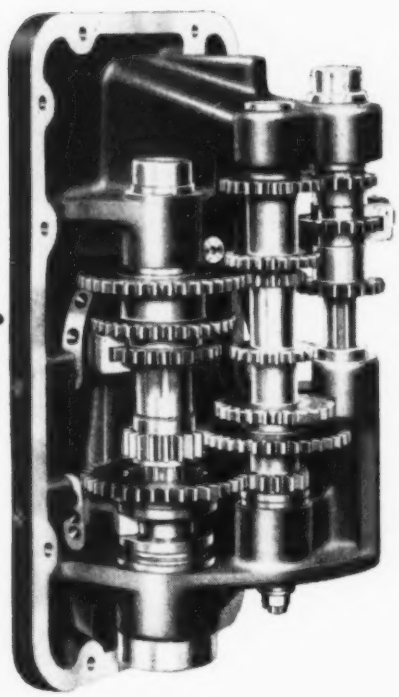
Mr. M. E. Pease of Derby & Co., Ltd., London, solved the October 16th puzzle, the 4-digit-multiplied-by-nine-thing. Mr. C. L. Ice of the Caterpillar Tractor Co., Peoria, came up with a most interesting solution, but it isn't quite right, old chap. The correct answer is 1089, 10989 and 109989.

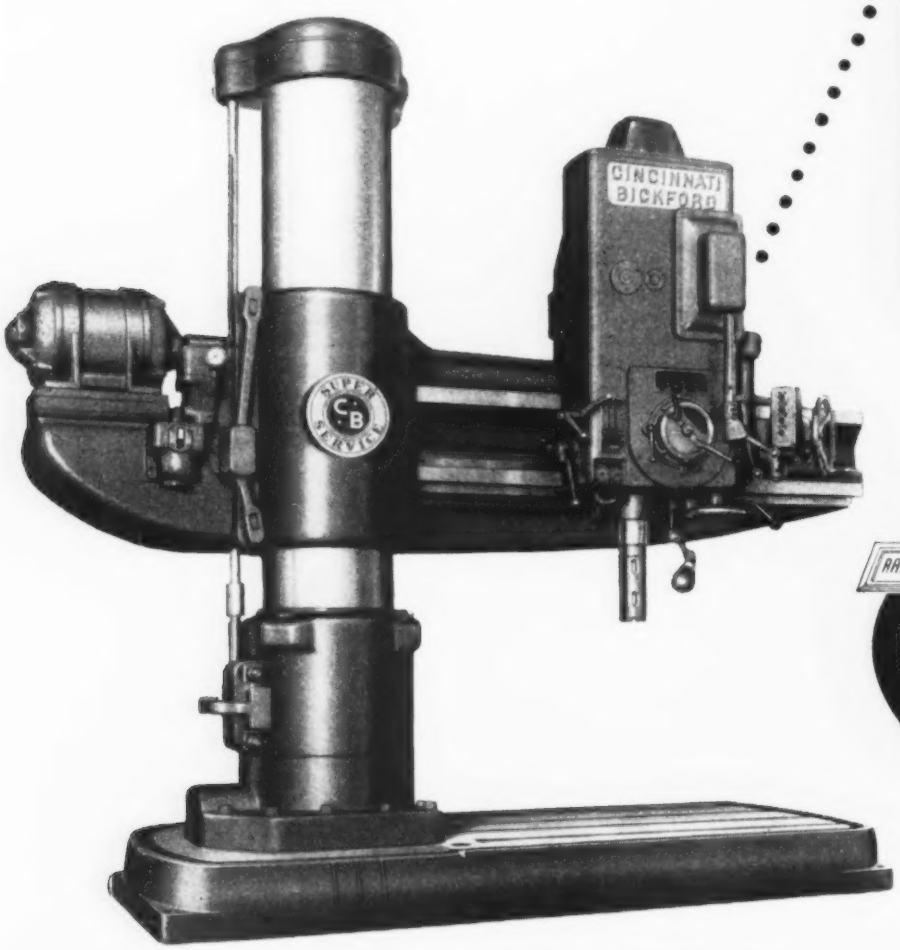
Laurels for the week, however, go to George Tuer, Research Assistant at M.I.T., who came loaded with solutions to not only the above digit problem, but also the coconut and gambler's puzzles. Mr. Woody Ulrich of the Perfect Circle Corp., Hagerstown, Indiana, also solved the coconuts.

Here's a new one: Thirteen children dance in a ring holding hands. How many rings may they form without a child ever taking any other child by the hand twice?

multiple **splined** *through-out*

This Super Service construction stands out in marked contrast to the previously accepted spring dive-key feed mechanism. The 18 feed changes are made through selective sliding gears, every gear being of heat-treated alloy steel, and every shaft is multiple splined. The superiority of the splined shaft construction is readily seen, with ease of shifting from one feed to another, efficient transmission of power without fear of shearing a key, and lower maintenance cost over long period of time. For further information on the many other patented exclusive features of the SUPER SERVICE RADIAL, write for Booklet R - 29.





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RADIAL AND UPRIGHT DRILLING MACHINES
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Radials 7½" dia. col., 2½' arm, to 26" dia. col., 12' arm.
General purpose Uprights, 21" to 28" sizes.
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Jig Borers, Portable Horizontals,
Spacing Table Machines.

Equal Efficiency of Every Unit Makes the Balanced Machine

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio, U.S.A.

Conventions & Meetings

Nov. 28-30—**Grinding Wheel Institute,** annual meeting, Hotel Statler, Buffalo. Association headquarters, P. O. Box 64, Greendale, Mass.

Nov. 30-Dec. 5—**American Society of Mechanical Engineers,** annual meeting, Statler Hotel, New York. Society headquarters are at 29 W. 39th St., New York.

Dec. 2—**National Warm Air Register Manufacturers Institute,** annual meeting, Cincinnati. Institute headquarters are at 5 E. Long St., Columbus, Ohio.

Dec. 2—**Spring Manufacturers Assn.,** annual meeting, Biltmore Hotel, New York. Association headquarters are at 249 Main St., Bristol, Conn.

Dec. 2—**Society of Automotive Engineers, Inc.,** Hotel Statler, New York. Society headquarters are at 29 W. 39th St., New York.

Dec. 3-4—**National Warm Air Heating & Air Conditioning Assn.,** annual convention, Sheraton-Gibson Hotel, Cincinnati. Association headquarters are at 145 Public Square, Cleveland.

Dec. 3-5—**Society for Experimental Stress Analysis,** fall meeting, Hotel McAlpin, New York. Society headquarters are at Central Square Station, Cambridge, Mass.

Dec. 3-5—**National Assn. of Manufacturers,** Congress of American Industry Waldorf-Astoria, New York. Association headquarters are at 14 W. 49th St., New York.

Dec. 4-5—**American Institute of Mining & Metallurgical Engineers,** Electric Furnace Steel Committee, Iron & Steel Div., annual conference, Hotel William Penn, Pittsburgh. Institute headquarters are at 29 W. 39th St., New York.

Dec. 7-10—**American Institute of Chemical Engineers,** annual meeting, Hotel Cleveland, Cleveland. Institute headquarters are at 120 E. 41st St., New York.

1953

Jan. 11-13—**Institute of Scrap Iron & Steel, Inc.,** annual convention, Hotel Commodore, New York. Institute headquarters are at 1729 H Street, Northwest, Washington.

Jan. 12-13—**Industrial Furnace Manufacturers Assn., Inc.,** midwinter meeting, Cleveland Hotel, Cleveland. Association headquarters are at 412 Fifth St., N. W., Washington.

Jan. 15-17—**National Tool & Die Manufacturers Assn.,** winter meeting, Sorrento Hotel, Miami Beach, Fla. Association headquarters are at 907 Public Square Bldg., Cleveland.

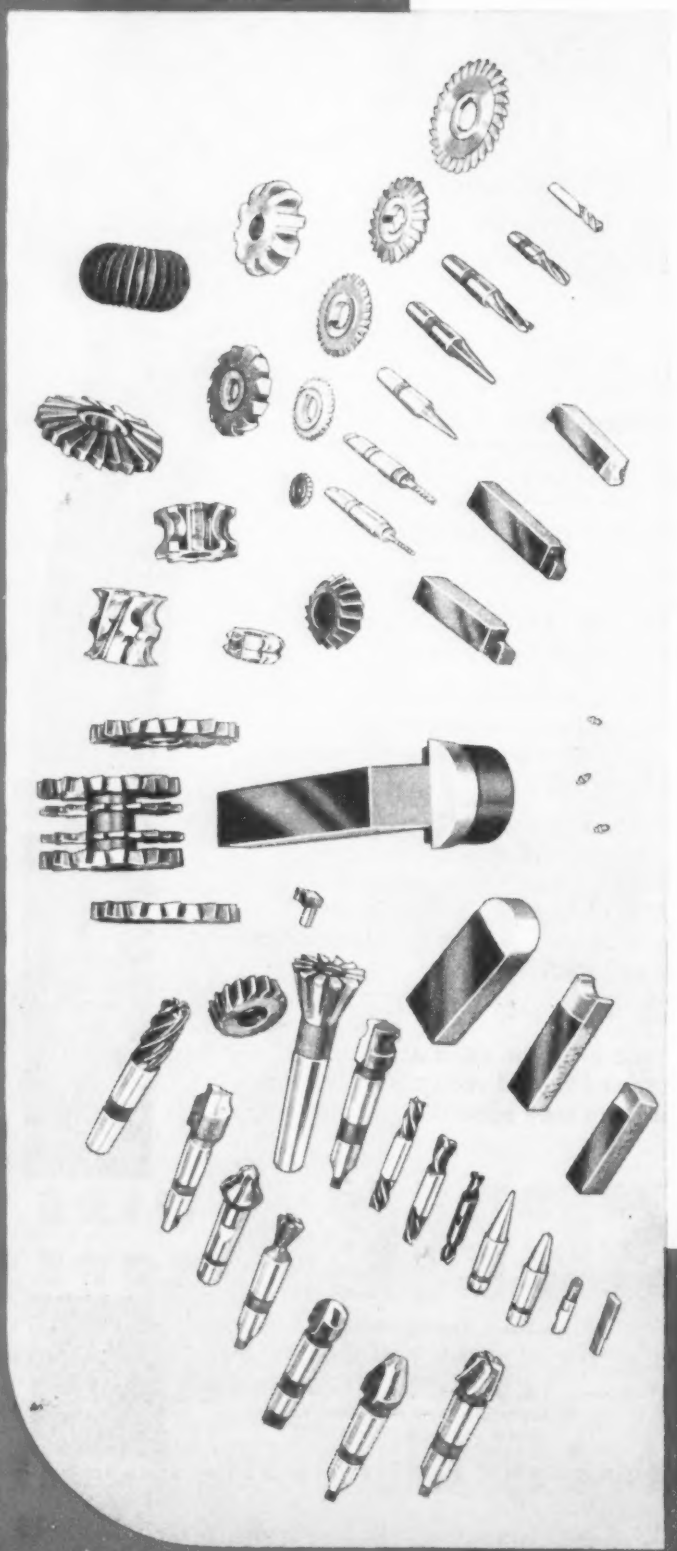
Jan. 21—**American Boiler Manufacturers Assn. & Affiliated Industries,** mid-winter meeting, Hotel Cleveland, Cleveland. Association headquarters are at 1571 W. 117th St., Cleveland.

Jan. 21-22—**Steel Shipping Container Institute,** winter meeting, Hampshire House and Hotel Pierre, New York. Institute headquarters are at 600 Fifth Ave., New York.

Jan. 26-27—**Compressed Gas Association, Inc.,** The Waldorf-Astoria, New York. Association headquarters are at 11 W. 42nd St., New York.

Feb. 16-19—**American Institute of Mining & Metallurgical Engineers,** annual meeting, Statler Hotel, Los Angeles. Institute headquarters are at 29 W. 39th Street, New York.

INCREASE and CUTTING EFFICIENCY LENGTHEN TOOL LIFE



The Pratt & Whitney Cutter and Radius Grinder sharpens almost every type of cutting tool accurately and economically. You will profit immediately by improved work quality, faster stock removal, longer tool life and reduced tooling costs.

Correct angles, radii and tangents are ground on both standard and special milling cutters; end mills; thread milling cutters; lathe, shaper and planer tools; form cutters; die sinking and cherrying cutters; and Keller cutters and tracer points. Straight or tapered flutes and ordinarily difficult jobs — like swinging accurate ball and radius noses on end mills — are easily handled.

The Pratt & Whitney Cutter and Radius Grinder is ruggedly constructed of the finest materials and will retain its initial accuracy through a long life and constant hard use. Two sizes accommodate flute lengths of 4½" and 10" respectively. To assure flute uniformity and concentricity, tools are ground as they are driven — from the shank and not from the centers. Operation is fast and easy.

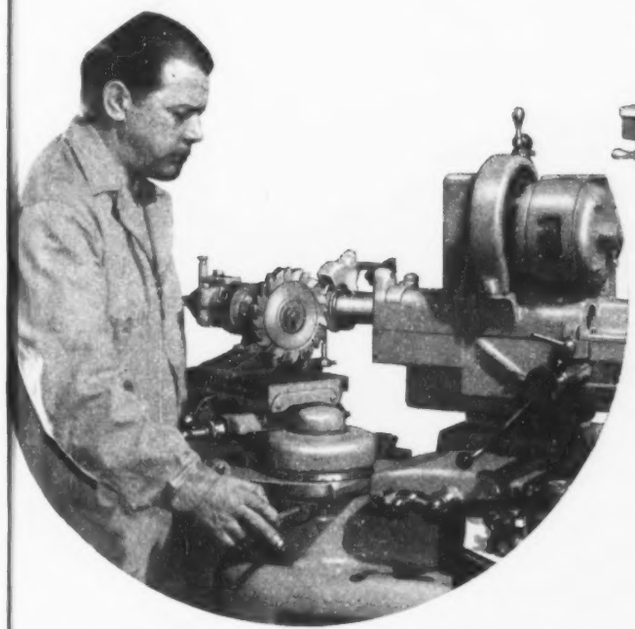
The P&W Cutter and Radius Grinder is a sound investment in added machining efficiency and tool economy. Send today for more complete information. Write on your Company letterhead for Circular No. S455-6.

for ALL YOUR CUTTER GRINDING AND SHARPENING

... stock or special

with the PRATT & WHITNEY

Cutter and Radius GRINDER



A VERSATILE TOOL SHARPENING MACHINE

GRINDS THEM ALL
- RADII, ANGLES, TANGENTS.
- STRAIGHT or TAPERED FLUTES.
- SQUARE, RADIUS and BALL ENDS.

ECONOMICALLY — ACCURATELY

PRATT & WHITNEY
DIVISION NILES-BEMENT-POND COMPANY
WEST HARTFORD 1, CONNECTICUT, U. S. A.

First Choice for Accuracy

BRANCH OFFICES... BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS (The Stanco Co.) • DETROIT • HOUSTON (The Stanco Co.)
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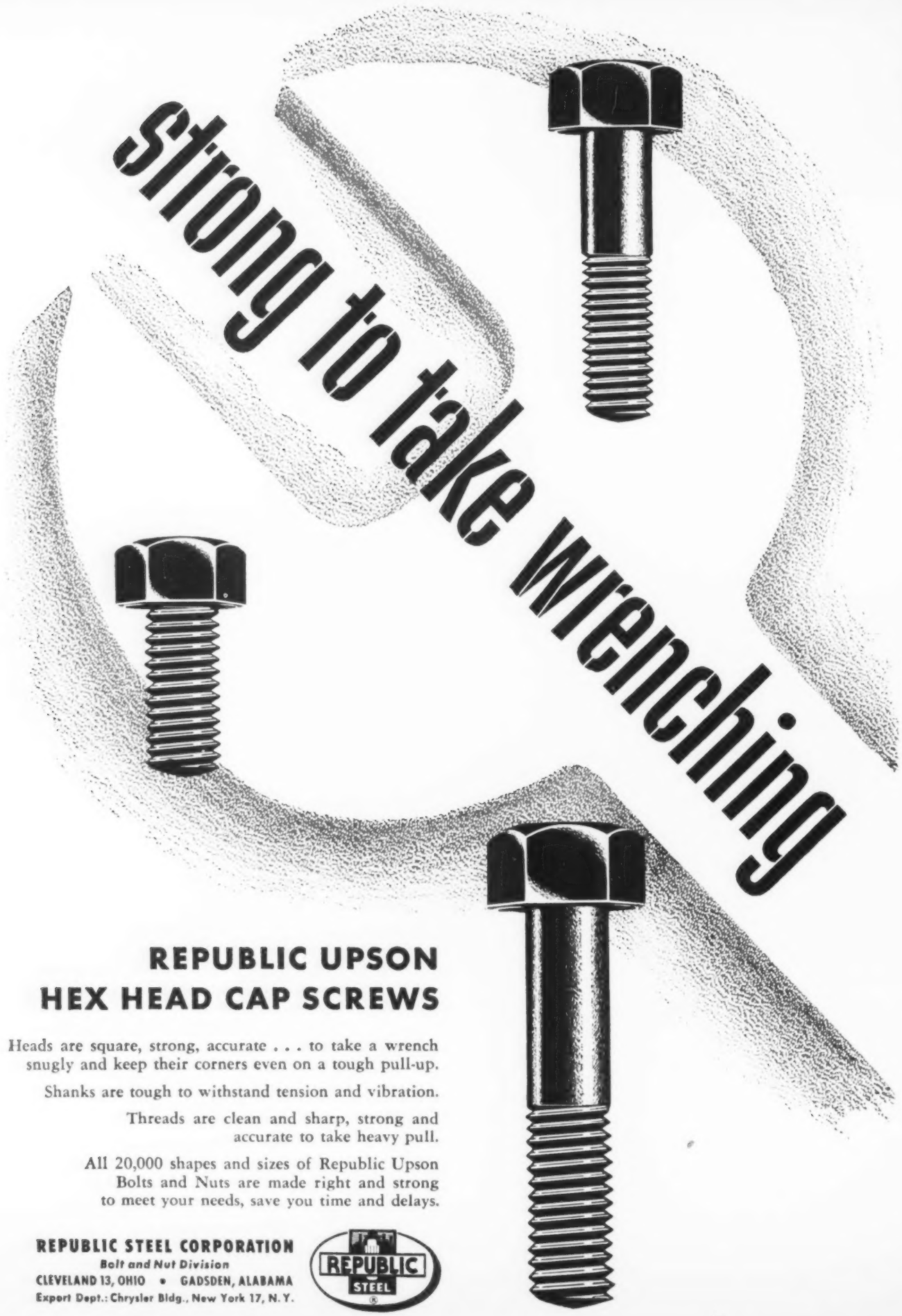
MACHINE TOOLS • CUTTING TOOLS • GAGES



REPUBLIC UPSON HEX HEAD CAP SCREWS

Heads are square, strong, accurate . . . to take a wrench snugly and keep their corners even on a tough pull-up.

Shanks are tough to withstand tension and vibration.

Threads are clean and sharp, strong and accurate to take heavy pull.

All 20,000 shapes and sizes of Republic Upson Bolts and Nuts are made right and strong to meet your needs, save you time and delays.

REPUBLIC STEEL CORPORATION
Bolt and Nut Division
CLEVELAND 13, OHIO • GADSDEN, ALABAMA
Export Dept.: Chrysler Bldg., New York 17, N. Y.

REPUBLIC STEEL

New facts for your file on U·S·S STAINLESS STEEL

Be sure you are acquainted with the physical properties and fabricating characteristics of grades available to you

Successful fabrication of Stainless Steels calls for a thorough knowledge of the physical properties and fabricating characteristics of each grade that is available to you. Since these properties and characteristics differ from those of plain carbon steel, modified working procedures are often required.

The complete line of U·S·S Stainless Steels covers a wide range of chemical compositions. However, these grades fall into two general classifications—the chromium-nickel Stainless Steels and the straight-chromium grades.

At the present time, nickel-bearing grades are restricted in their use by government order. For certain essential applications you are permitted to use these nickel-bearing grades, but for the most part you will be working with straight-chromium Stainless Steels.

If your experience has been concentrated on the nickel-bearing grades, it is essential that you know the respects in which straight-chromium Stainless Steels differ. Fabricators who have used these straight-chromium grades as alternates to nickel-bearing Stainless Steels report no difficulty in handling them when proper methods are used.

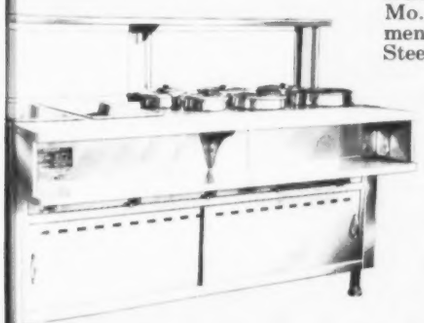
No matter what grades of Stainless Steel you are called on to work with, detailed knowledge of the physical properties and fabricating characteristics is a must for satisfactory performance and economical handling.

Detailed information in this FREE book

You'll find a wealth of information on all grades of U·S·S Stainless Steel in our book "Fabrication of U·S·S Stainless and Heat Resisting Steels." If you'd like a copy, write to United States Steel Company, Room 2806-T, 525 William Penn Place, Pittsburgh 30, Pa.

In addition, our representatives will be glad to assist you in selecting steels and fabricating methods where unusual conditions must be met. Feel free to ask for this help.

Type 430 Stainless successfully replaced nickel-bearing grade in this food serving equipment



Duke Manufacturing Company, St. Louis, Mo.—manufacturer of food serving equipment—has been using Type 430 Stainless Steel as an alternate material for many months now. In every case, the same gage was used in Type 430 that had been used in nickel-bearing grades.

On the basis of this experience, General Manager J. M. Johnson reports:

"We find that Type 430 Stainless Steel is entirely satisfactory in appearance, durability and ease of maintenance for our Thermaduke food warmers and cafeteria counters. In every case, we have followed virtually the same fabricating techniques used with nickel-bearing grades."

USS SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL COMPANY, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

"We know how t

says George Sumner, U

382

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FRONT

133"

75"

UNITED STATES STEEL

ow to handle big ones like this"

UNITED STATES STEEL MACHINIST

● The man in the picture is Machinist George W. Sumner, who has worked in the Forge Department of our Homestead District Works for 43 years. After the steel has been poured, heated, forged, heat-treated and inspected many times—George sets it up on his 15-foot planer and goes to work.

If you asked him to tell you about it in his own words, the conversation might go something like this:

YOU: *"That's a mighty big forging you've got there. What is it?"*

SUMNER: "It's a forged anvil base for a large drop hammer. We started off with a 500,000-pound ingot, but when I'm through with it, it'll ship out at around 300,000 pounds. Right now, it's 14 feet long, 6 feet wide, and 7 feet high."

YOU: *"Must be quite a job handling it on the planer."*

SUMNER: "Well, it's not exactly child's play. Setting it up correctly is very important. The weight must be spread out properly, because even on this big machine we work down to a few thousandths of an inch."

YOU: *"But once you've made the set-up, the planer runs automatically, doesn't it?"*

SUMNER: "Sort of, but no planer knows how to think. Take lubrication for instance. We have an automatic oil pump, gages and all that. But when you're cutting the short side of a piece, the table only takes a short stroke, and part of the ways don't get oil. If you keep that up, the ways get hot and they warp, and your accuracy is gone. So the operator—that's me—solves the problem by taking long strokes every once in a while, to spread the oil."

YOU: *"In your opinion, what's the secret of making good forgings?"*

SUMNER: "Good steel to start with—and good equipment to work it on. We have both. Then you've got to know what you're doing and take time enough to do it right. You can't leave anything to chance. That's the only way you can be sure your customer will get what he's ordered—a *quality* forging.

• • •

When you buy forgings from United States Steel Company, highly skilled men like George Sumner will work on them. We will match their knowledge and experience against the best in the land. For more information on U·S·S Quality Forgings, write to United States Steel Company, 525 William Penn Place, Room 2806-T, Pittsburgh 30, Pa.

New facts for your file on U·S·S

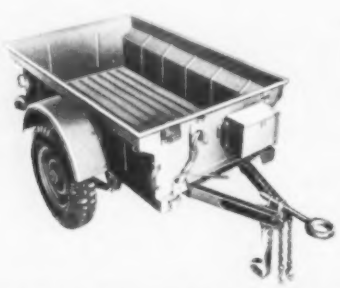
EQUIPMENT DESIGNERS CONTINUALLY FIND NEW USES

Hot water tanks weigh 16% less, require 27% less steel, cost 15% less to ship when built with U·S·S COR-TEN steel.

By using U·S·S Cor-Ten steel in place of carbon steel in their famous "Dura-Stone lined" water heaters and water softeners, the Troop Water Heater Co., Pittsburgh, Pa., has been able to reduce shell thickness in some of these units as much as 31%.

This weight saving in the shell, reduces the total weight of the units about 16%, makes them more readily handled and easier to install. Shipping costs are 15% lower—a sizeable saving when distant markets are being served.

In fabrication, the manufacturer reports, U·S·S Cor-Ten steel offers further worthwhile advantages. Because it is stiffer it forms more smoothly in the bending rolls—fluting difficulties disappear. In welding, Cor-Ten steel behaves better than plain steel, does not tend to burn away under the arc, welding is easier and faster.



In cargo trailers designed for air transport U·S·S COR-TEN steel reduces weight 25%.

This general-purpose Army trailer must be able to carry 500 lbs. of cargo at high speeds over open country and to haul 750 lbs. on highways. That means it has to be very strong and exceptionally rugged. But it also has to be as light as possible so it can be readily air transported. To obtain maximum strength with minimum weight, U·S·S Cor-Ten steel was used both in the main frame side members and in the towing yoke channels. Weight of these members was reduced 25%, yet they are much stronger, tougher, and have more resistance to fatigue, shock and corrosion than if they had been made of heavier carbon steel. This unit was built by Dunbar Kapple, Inc., Geneva, Illinois.

The reason . . . its proved ability

● When U·S·S Cor-Ten—the pioneer low alloy, high-strength steel—was originally developed we had in mind one particular field for its use, namely, to lift the costly drag of deadweight from every kind of *mobile* equipment.

So at first, U·S·S Cor-Ten steel was used to trim thousands of pounds of useless weight off freight and passenger cars. With it, trucks and buses were built lighter. So were mine cars, cranes, shovels, and earth moving machinery of all kinds. Because this equipment weighed less, it did more work, carried bigger loads, cost less to operate. It also lasted longer. Before long, Cor-Ten steel construction had earned a world-wide reputation for reducing weight and reducing costs in equipment that moved or was used to move other materials.

But design engineers, quick to see other possibilities in Cor-Ten steel, rapidly expanded its application to all sorts of *stationary* equipment as well. They figured, and rightly, that when you can *save weight* in any product, you can *save steel*, and *save shipping costs*, too, both on the steel you use and in the manufactured product you ship.

In U·S·S Cor-Ten steel, equipment designers have found a material admirably suited for this purpose. Here is a steel, comparatively low in cost, having good working and welding

Hard working farm equipment built with U·S·S COR-TEN steel does more, lasts longer and is more dependable.

John Deere uses U·S·S Cor-Ten steel in the main axle and in the tractor hitch frame of its famous No. 12-A Combine. Without increasing weight, Cor-Ten steel gives these vital parts maximum strength, maximum toughness and what is of special importance, ensures high fatigue resistance—50% greater than that of plain carbon steel. Racking and twisting strains that could easily cause damage are safely absorbed by Cor-Ten's higher endurance limit . . . and the equipment stays on the job.

This application is typical of Cor-Ten steel's increasing use in farm equipment such as feed trucks, grain trailers, fertilizer spreaders, farm wagons and stake bodies. As one manufacturer puts it, "Because farm equipment takes terrific abuse in the field and is generally exposed to the weather without any protection whatsoever, we have found high-strength steel construction a 'must'."

U·S·S HIGH STRENGTH STEELS

U·S·S COR-TEN · U·S·S MAN-TEN · U·S·S TRI-TEN

HIGH STRENGTH STEELS

USS TRADE MARK HIGH STRENGTH STEEL UNITED STATES STEEL

FOR U·S·S COR-TEN HIGH STRENGTH STEEL

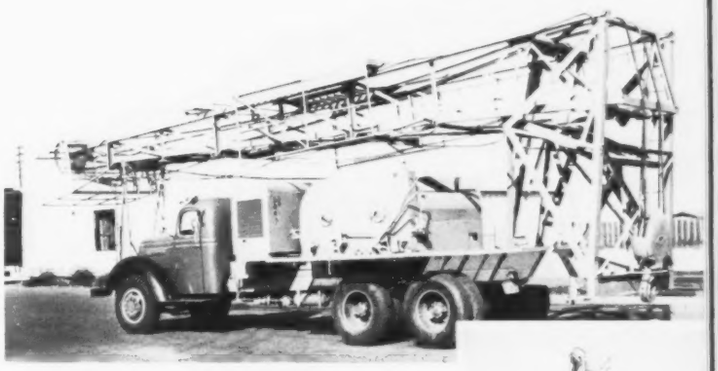
to reduce weight, increase durability and cut costs.

properties, with which they can safely and economically reduce weight—but which has the further important advantage of *great durability*. For COR-TEN steel not only has a yield point one and a half times that of carbon steel but it has 50% higher fatigue strength, offers superior resistance to abrasion and impact, and in addition has unusually high resistance to atmospheric corrosion—4 to 6 times that of plain steel.

As a result, U·S·S COR-TEN steel is now being extensively used, not only in mobile equipment, but to reduce the weight, or to increase the life, of water heating tanks, shipping containers, storage racks and bins, pallets, refrigerator sheets, metal awnings, smoke stacks, shower partitions, floor plates, transformer housings, pole line hardware etc. New applications are constantly being turned up.

In these products, every pound of weight saved has meant fewer pounds of metal to buy—fewer pounds to move—and fewer pounds to ship. That makes for SAVINGS all along the line.

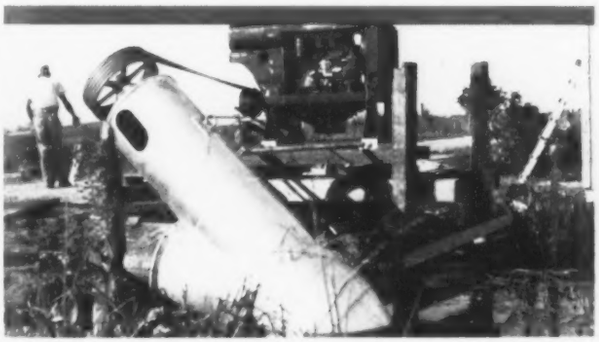
If you want to reduce the weight of your equipment without reducing its durability—or to increase its durability without increasing its weight—get more information by sending for our booklet on U·S·S COR-TEN steel.



Portable derrick built 5 ft. higher than before, weighs 800 lbs. less—brake drum lasts 5 times longer—when COR-TEN steel replaces carbon steel.

By taking advantage of U·S·S COR-TEN steel's greater strength and durability, Hopper Machine Works, Inc., Bakersfield, Calif., were able to increase the height of this portable drilling rig from 47 feet to 52 feet and at the same time reduce derrick weight 800 lbs.

Impressed by COR-TEN steel's performance in the derrick structure, the manufacturer decided to utilize its superior properties elsewhere. By using 1" COR-TEN steel plates in place of both mild steel and cast steel for brake drums, drum life was increased approximately 5 times.



Irrigation and drainage pumps, built of U·S·S COR-TEN steel, operate without repairs, last 4 times as long.

Built by the Couch Manufacturing Co., numerous turbine pumps like this, with a capacity up to 80,000 gallons per minute, have been in operation since 1938 in the South Florida water control development.

Installed in silty water containing tannic and sulphuric acid in varying amounts, pumps are alternately submerged in the water and exposed to the atmosphere. Under these severe conditions, it has been necessary to make repairs to pumps built of plain carbon steel* which had corroded after 5 or 6 years.

In contrast, all pumps built of U·S·S COR-TEN steel are still in service—during 14 years' operation have never been pulled out for repairs of any kind. "And," says W. W. Kerr, President of Couch Manufacturing, "they are in apparent good condition and should easily last another 10 years. I place their life expectancy as at least 4 times that of carbon steel."

**Built during the war when COR-TEN steel could not be obtained.*

GET COMPLETE INFORMATION.

MAIL THIS COUPON!

United States Steel Company
525 William Penn Place, Room 2806-T
Pittsburgh 30, Pennsylvania

Please send me a copy of your book "U·S·S COR-TEN."

Name ..... Title .....

Company .....

Address .....

City ..... State .....

New facts for your file on

U·S·S CARILLOY STEELS

U·S·S CARILLOY steel springs soak up 8 million lb.-ft. torque!

Alloy springs cushion tremendous mechanical shocks in 200-ton short-circuit generators . . . save expense of forgings

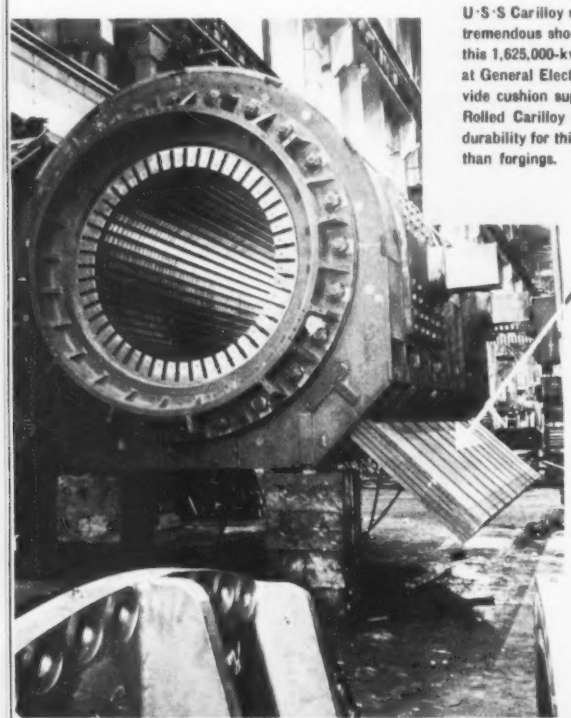
● In testing high-voltage circuit breakers, engineers at General Electric Company *intentionally* short-circuit two huge motor-driven generators. Each of these test generators is normally rated at 125,000 kva, but provides short-circuit currents as high as 182,000 amp, instantaneous peak of the offset wave, corresponding to about 1,625,000-kva rms symmetrical short-circuit duty. Such operation causes tremendous mechanical stresses to build up inside each machine. These stresses create a torque that tries to twist loose the 200-ton stator assembly.

But no damage is done! These powerful machines are mounted on U·S·S CARILLOY steel plate springs that cushion the shock and then damp out any vibrations that follow. The springs must absorb these terrific shock torsion loads as often as 40 times an hour; so a tough, very durable steel is needed.

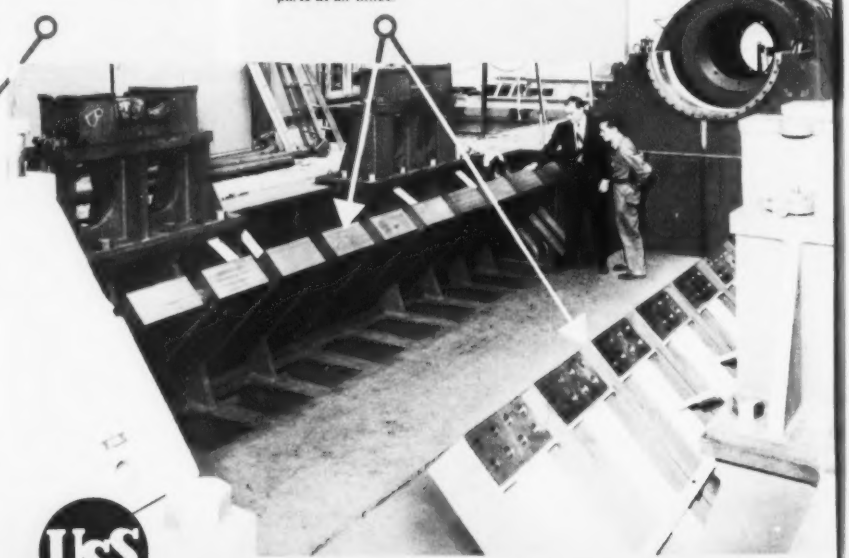
Forged springs were considered first. But GE engineers, with the cooperation of United States Steel metallurgists, found that a rolled alloy steel, U·S·S CARILLOY 4340, provides the required mechanical properties at *much lower cost*. This steel is tough, even though extremely hard, and it assures good endurance at 40,000 psi. as required in this application. In addition, it is easy to heat-treat.

This CARILLOY steel is giving excellent service. Under the most severe short circuit, developing a whopping *8 million lb.-ft.* of torque, frame rotation is about ½" each way at the point of attachment of the springs. And the axial centerline of the machine stays within 30 mils of its normal position. These movements are sufficient to cushion the shock effectively.

Any time you need a steel that will provide high strength and toughness, superior resistance to shock and torsion with minimum weight, or any combination of these properties, look for a CARILLOY steel. Experienced U·S·S metallurgists will gladly help you choose the one best suited to your requirements.



U·S·S Carilloy steel plate springs cushion the tremendous shock torsion loads developed in this 1,625,000-kva short-circuit test generator at General Electric Company. They also provide cushion support for the stator assembly. Rolled Carilloy 4340 has the toughness and durability for this application, and it costs less than forgings.



The 200-ton stator assemblies of General Electric's short-circuit test generators are mounted on Carilloy plate springs like these. The springs are mounted at a 45° angle to provide both rigid vertical support and cushioning of shock torsion loads. They keep the stator properly aligned with other machine parts at all times.

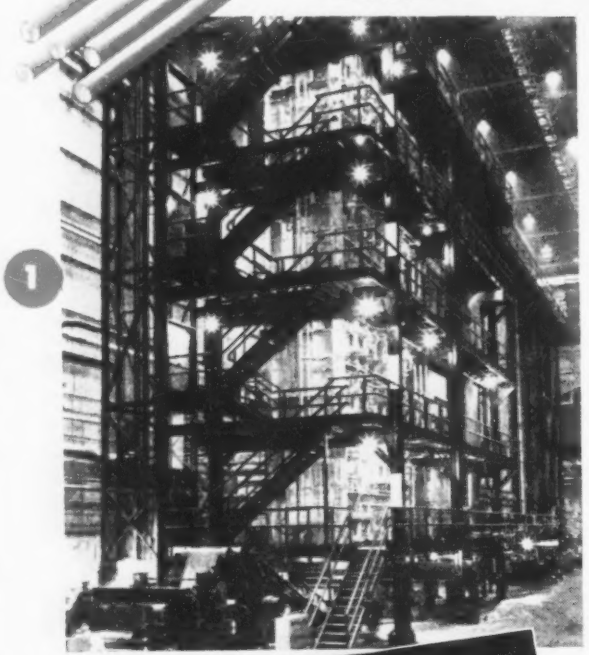
USS

UNITED STATES STEEL COMPANY, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

Improved product
Reduced finishing costs
Greater customer acceptance

Finished steel quality control is the goal of every Steel Maker. Steel finishing under precise atmosphere control is the answer. It assures premium quality at lower ultimate cost. Some applications of these "Surface" generators are described below.



BRIGHT ANNEALING, STRIP

1 — *Continuous bright annealing of strip*, for tin plating, is carried out at high speeds in this vertical strand furnace. NX or HNX atmosphere can be used.

2 — *Batch bright annealing of coiled strip* is accomplished in lift cover furnaces of the type shown. In this single row installation, NX protective atmosphere is used.

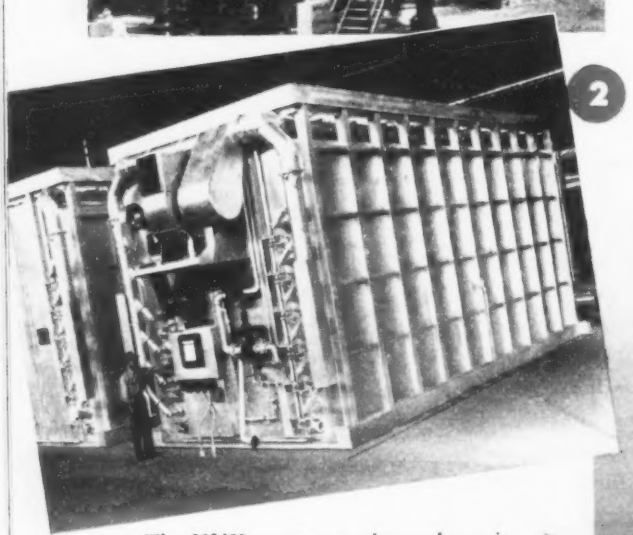
CARBON CORRECTION, BAR STOCK

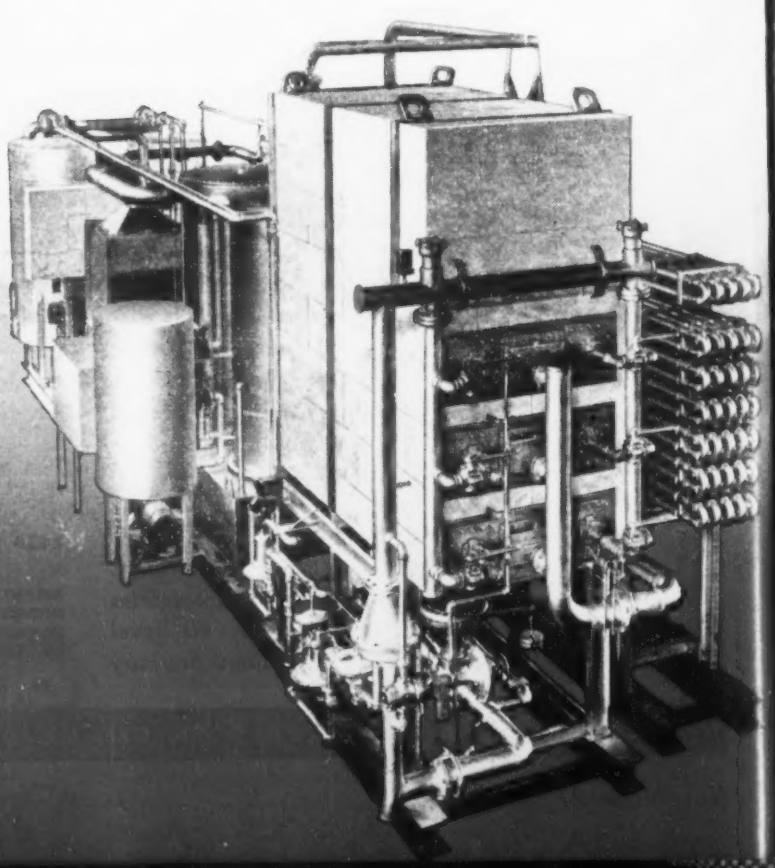
3 — *Batch carbon restoration* utilizes this lift cover, carbottom type furnace for simultaneous skin recovery and clean annealing. Here again, the reactive carbon medium is enriched RX atmosphere and the protective medium is NX atmosphere.

4 — *Continuous production carbon restoration of bar stock* is accomplished in this roller hearth furnace in conjunction with clean annealing. Enriched, RX atmosphere, is used as the carburizing medium and NX atmosphere for surface protection.

BRIGHT ANNEALING, SHEET

5 — *Continuous bright annealing of stainless clad sheet* in this disc hearth furnace with special rapid air quench chamber utilizes a protective atmosphere of DX gas.



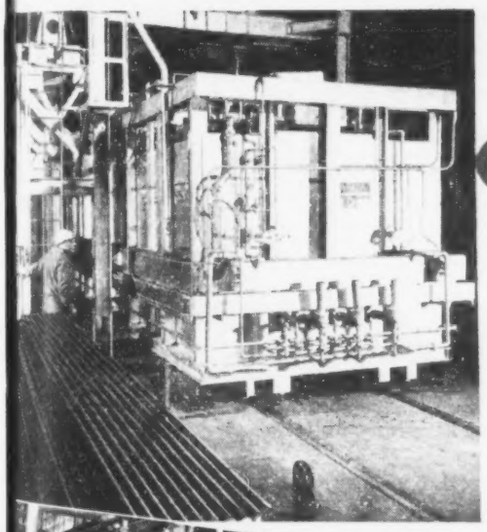


The HNX generator, shown here, is one of the five principal atmosphere generator types—RX, DX, NX, AX—built by Surface Combustion. They represent the engineering skill and 'know how' of 40 years standing in serving the nation's steelmakers. They make finished quality steel a practicality.

For complete information on the applications of these atmospheres, write for Bulletin S-52-3.

YOU GET ALL 3 WITH *Surface*

CONTROLLED ATMOSPHERE



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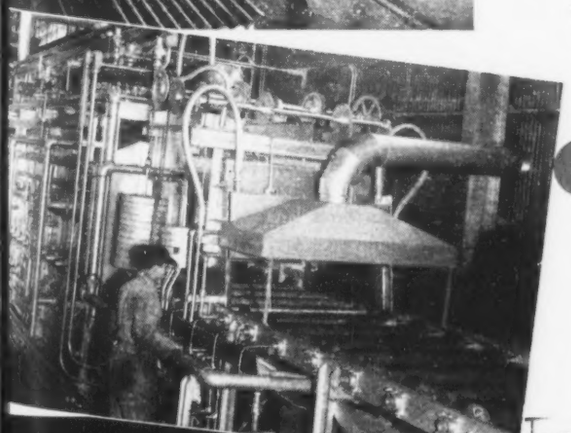

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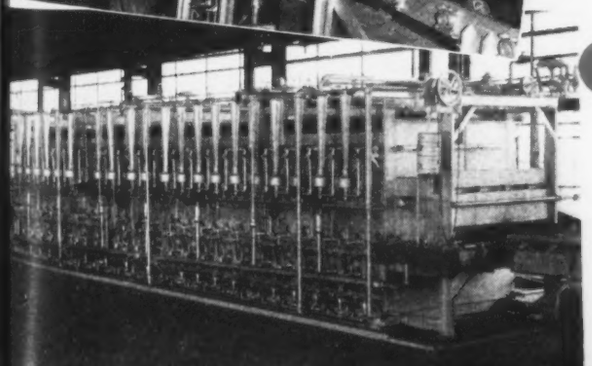


5

FURNACES AND GENERATORS

Controlled atmospheres have opened up endless possibilities throughout the Steel Industry for the safeguarding of product quality and increasing customer acceptance. Case carburizing . . . dry cyaniding . . . homogeneous carburizing . . . carbon restoration . . . clean hardening . . . bright or clean annealing . . . galvanizing . . . are among the important finishing operations, which come under its influence. These can be accomplished faster and with far better results using controlled atmospheres than by direct heating methods.

'*Surface*' has contributed materially to the success of controlled atmosphere in the Steel Industry. '*Surface*' Furnaces and Generators have given controlled atmosphere processes full production status at a time when increased tonnage plus an improved product are vital.

Into the design and construction of 'Surface' Controlled Atmosphere Furnaces and Generators have gone the best engineering talent available. Each atmosphere type has been developed to 'shoulder' a definite set of responsibilities in the treatment of steels (or non-ferrous metals) and to do its job well. Nothing has been overlooked to make 'Surface' the "buy word" in dependable controlled atmosphere equipment and its applications.

'*Surface*', acknowledged as a great name in the Steel Industry for over a quarter-of-a-century—with hundreds of successful Steel Mill installations to its credit—invites you to share in its experience and 'know how' in the interest of quality . . . an improved product at worthwhile savings.

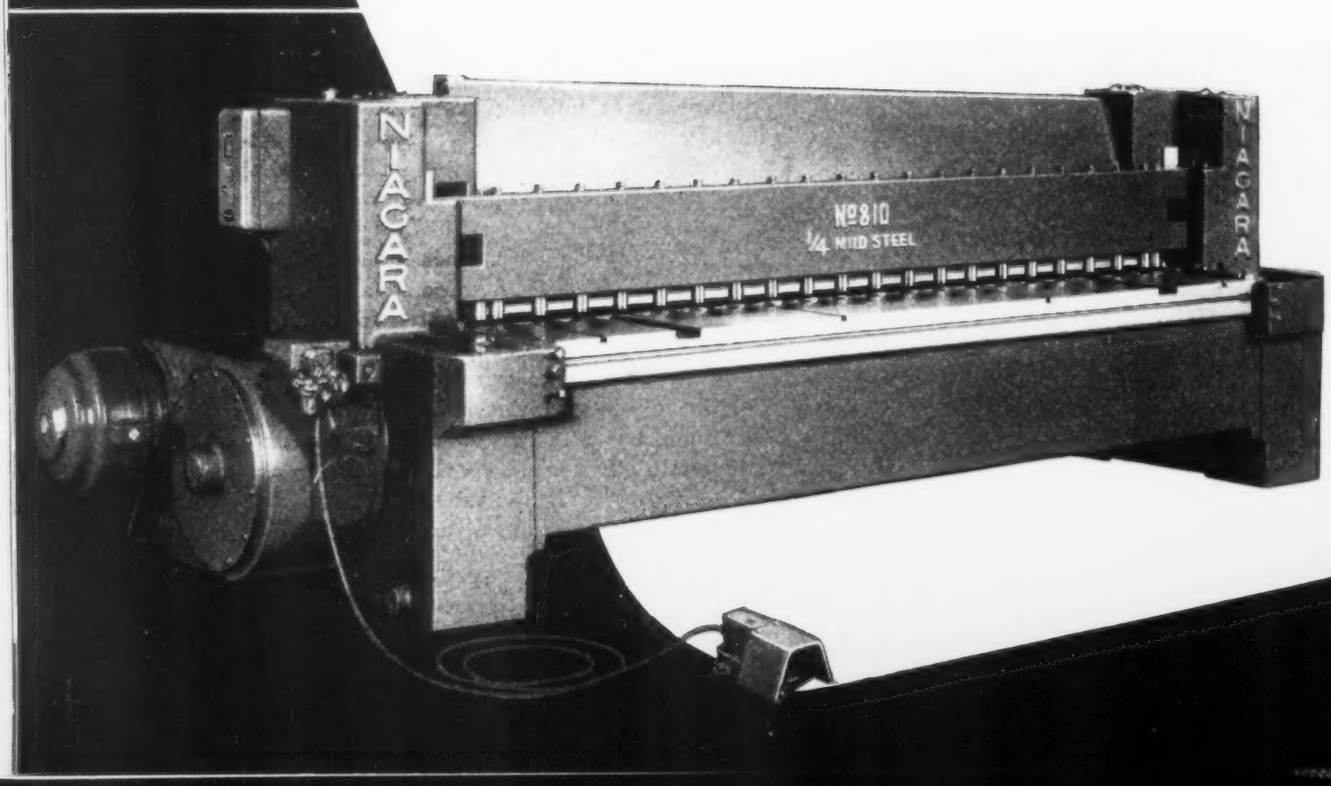
SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

FOREIGN AFFILIATE COMPANIES

BRITISH FURNACES LIMITED—CHESTERFIELD
STEIN & ATKINSON, LTD.—LONDON
STEIN & ROUBAIX—PARIS, LIEGE AND GENOA
WILL L. SMITH, S.A.—BUENOS AIRES

NIAGARA SHEARS

at General Sheet Steel Co., Detroit, Mich.



NIAGARA

POWER SQUARING SHEARS

after shearing
thousands of tons
of steel
of all kinds

LET'S LOOK AT THE RECORD!

NIAGARA
Shears are designed for
HIGH VOLUME SHEARING
ACCURACY
DEPENDABILITY
LOW MAINTENANCE COSTS

Write for Bulletin 69

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

Manufacturers of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA

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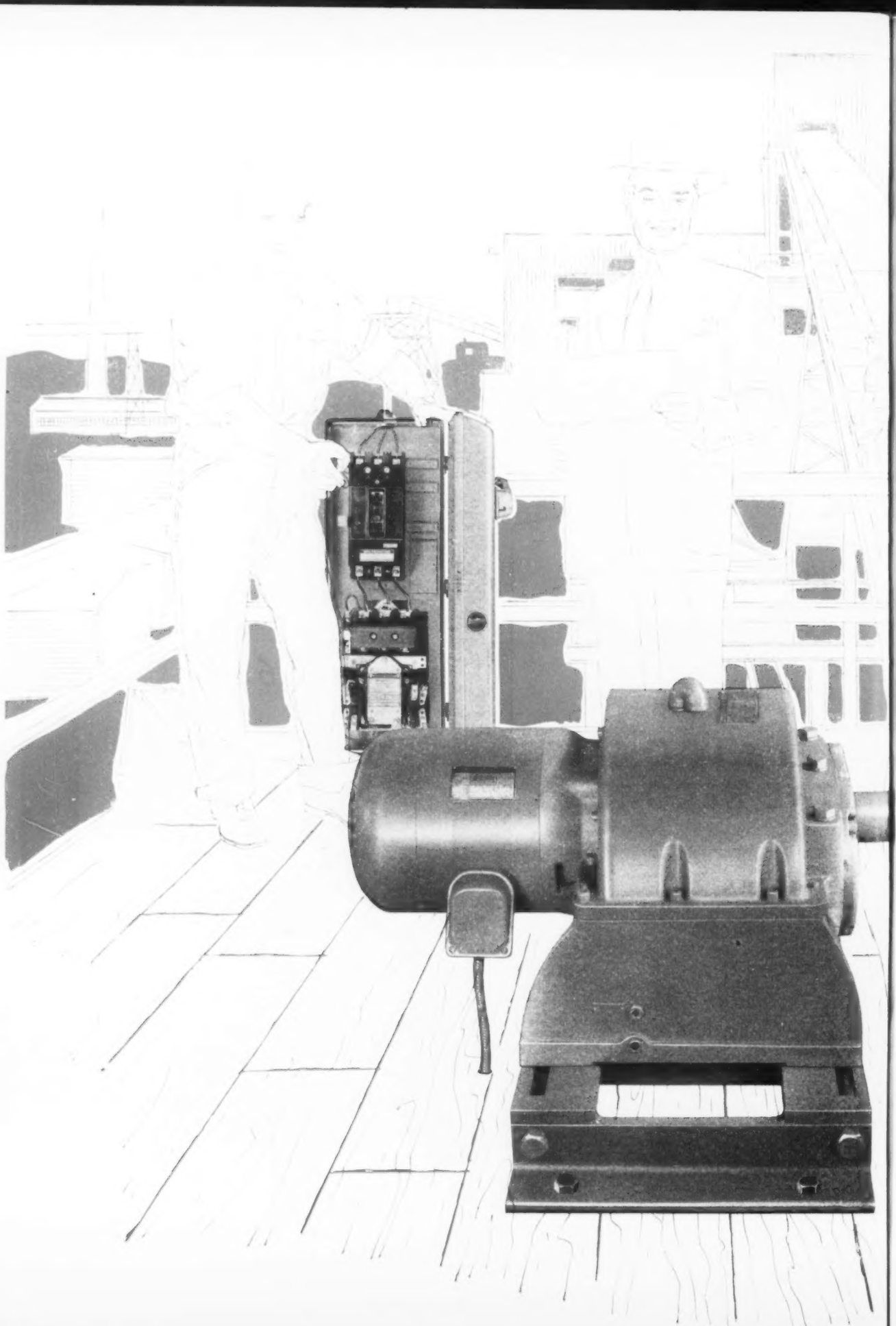


"We can service this Drive Team faster

because all parts are more accessible"

"I'm the fellow who has to live with the gearmotors and controls that we purchase. That's why I'm interested in what it takes to get at the *working parts.* I don't want equipment that only a contortionist could service.

"Take a look at this Westinghouse Combination Life-Linestarter. It offers both circuit and motor protection all in one enclosure. Every screw can be reached from the front—every part can be removed from the front. This saves me considerable time and effort when I have to service the device or change a heater. Installing these starters is simpler too, thanks to the straight-through wiring and pressure-type connectors. I don't have to guess at wire lengths or hunt for terminals.

"Now look at this Westinghouse Life-Line Gearmotor. The split-case construction really is the answer to getting at the working parts. The upper-half case is easily removed for inspecting gears and bearings. I don't have to disturb the alignment or drain the oil. Removing the motor is a cinch. And look! There is no shimming or motor coupling to realign.

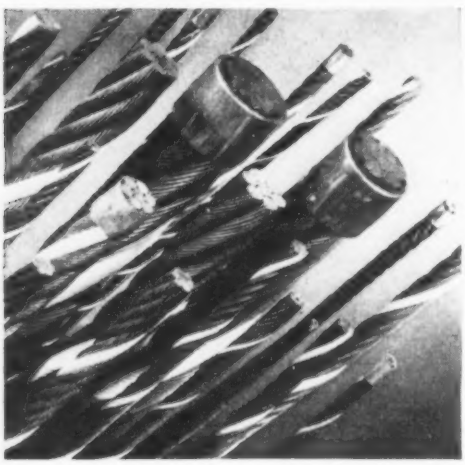
"We've found it's easier to live with our drives when we specify Life-Line Gearmotors and Life-Linestarters." You can do the same. Just call your local Westinghouse representative for full details, or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-07304

YOU CAN BE SURE... IF IT'S

Westinghouse

Life-Line GEARMOTORS AND Life-Linestarters

MACWHYTE



PREformed . . . Internally Lubricated

WIRE ROPE

for all equipment

From Macwhyte's complete line of a thousand and one sizes and types you get rope best suited to your equipment, designed, PREformed, and internally lubricated to provide long, safe service. (Ask for Catalog G-15.)

Wire Rope

SLINGS

for lifting and moving materials and equipment in production or maintenance.

There are hundreds of types and sizes of Macwhyte Flat-Braided, Round-Braided, Single-Part, and Grommet Slings. All are custom made in length, capacity, and flexibility to meet your needs. (Ask for Catalog S-8.)

Wire Rope

ASSEMBLIES

for machine parts, controls, and operating devices.

Macwhyte Safe-Lock wire rope assemblies are made to order in length, strength, and flexibility desired. Terminals are permanently attached to one or both ends. There are many standard types. (Ask for Catalog 5201.)

Macwhyte Company, 2011 Fourteenth Avenue, Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope and Wire Rope Assemblies. Mill depots: New York • Pittsburgh • Chicago • St. Paul • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.

Catalogs are available on request to Macwhyte Company or authorized distributor.

MACWHYTE COMPANY
KENOSHA, WIS.

1016 SW

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

CONTINUOUS CASTING OF STAINLESS and alloy steels will be undertaken by Atlas Steels Ltd., Welland, Ont. The continuous casting machine, of 100 sq in. cross-section, was ordered from Continuous Metalcast Co., Inc. It is expected to be operating by Fall of 1953.

INDUSTRIAL NOISE SUPPRESSION is getting more attention. It's recognized as a factor in worker morale. Potential benefits have persuaded companies to attack the problem scientifically. Advantages often go beyond improvement in worker efficiency.

GOVERNMENT BAR PURCHASES are expected to continue an upward curve through the second quarter, steel sources say. Materials referred to are shell quality bars.

BIGGER AND FASTER STAMPING PRESSES are coming up. Where big presses have been operating at six strikes per min, new presses are expected to operate at eight to ten strikes per min.

LOWER AUTOMOBILE PRICES MAY BE POSSIBLE when and if controls are lifted. Higher production schedules, smoother flow of supplies, absence of expensive conversion deals will lower unit cost substantially. Price cutting could follow tough competition.

BACKLOG OF WAREHOUSE DEMAND is expected to sustain tight steel market in midyear. One warehouse firm is reportedly holding $11 million cash earmarked to rebuild depleted steel inventories.

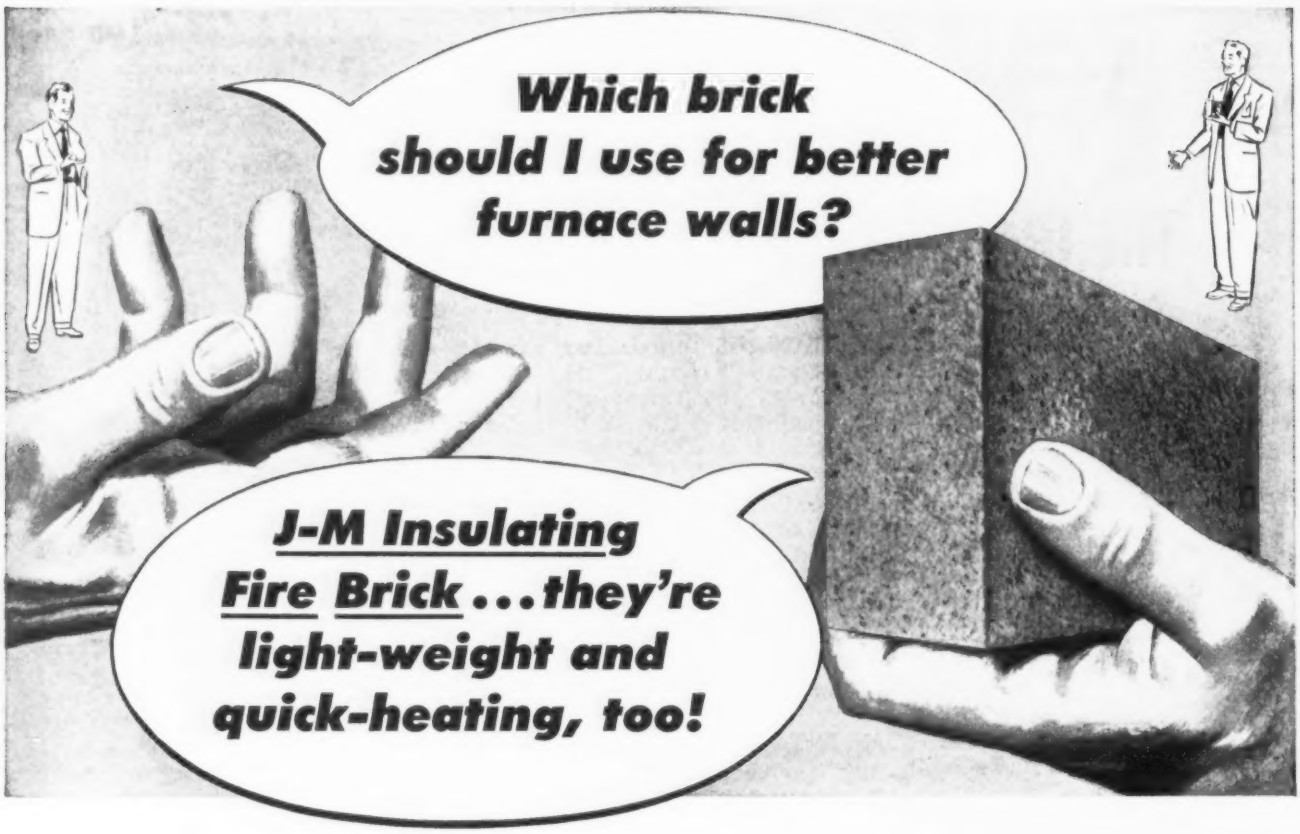
CONCERN OVER WIDE TENSILE STRENGTH SPREAD of available commercially pure titanium has been expressed by the aircraft industry. The industry considers 20,000 psi tops. But materials producers have trouble limiting the spread to less than 40,000 psi. A limit of 90,000 psi ultimate tensile may be set for commercially pure material which is to be spotwelded.

QUICK TREATMENT FOR BURNS AND CUTS suffered by workers in industry is possible through use of an aeroplast dressing tested by the Air Force. Inexpensive and easy to apply, the transparent plastic forms a coating 0.005 in. thick.

SHORTAGE OF SKILLED AND SEMISKILLED MEN IN THE CLEVELAND AREA is forcing relaxation of hiring standards. Employers, now recruiting labor outside the area, may use more women, older persons, handicapped and inexperienced workers. Trainee programs are hampered by lack of men in the 18 to 25-year range.

CIO UNIONS STILL FIGHT technological improvements even though the late Philip Murray is on record as saying they have made 20 million jobs in steel. CIO unions fight automatic machinery, force building of new plants in new areas rather than modernization of existing facilities.

LACK OF ADEQUATE DIESINKING CAPACITY is a major drawback in the Air Force heavy press program. Existing capacity is 40,000 to 50,000 tons annually, mostly in smaller sizes. Annual requirements when the heavy press program gets rolling are expected to be from 50,000 to 75,000 tons.



6 types . . . for savings in services up to 3000F

Because of their quick-heating and low-heat transfer characteristics, Johns-Manville Insulating Fire Brick are efficient fuel-savers for use at operating temperatures up to a full 3000F on the insulation.

Each type of J-M Insulating Fire Brick has the correct balance of thermal and physical properties that assures maximum economies within a specific temperature range. All types are *quick-heating* . . . operating temperatures are reached in a short time, thereby saving fuel.

Identical materials can also be obtained in large size units known as Johns-Manville Insulating Fireblok. Fireblok have the same properties as the brick, but are made in extra large sizes for added construction economies. The large units can be installed faster . . . require fewer joints and less bonding mortar. During rebuilding or repair, furnace down-time is appreciably shortened with Fireblok construction.

A Johns-Manville insulation expert will gladly explain the advantages and economies of using J-M Insulating Fire Brick and Fireblok for refractory linings or as back-up insulation behind other refractory protection. Write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

Properties	Types of Insulating Fire Brick and Fireblok					
	JM-3000	JM-28	JM-26	JM-23	JM-20	JM-1620
Temperature limit	†3000F	†2800F	†2600F	†2300F	†2000F	‡2000F †1600F
Density, lb per cu ft	63—67	58	48	42	35	29
Transverse strength, psi	120	120	125	120	80	60
Cold crushing strength, psi	300	150	190	170	115	70
Linear shrinkage, percent	*0.8 at 3000F	4.0 at 2800F	1.0 at 2600F	0.3 at 2300F	0.0 at 2000F	0.0 at 2000F
Reversible thermal expansion, percent	0.5—0.6 at 2000F	0.5—0.6 at 2000F	0.5—0.6 at 2000F	0.5—0.6 at 2000F	0.5—0.6 at 2000F	0.5—0.6 at 2000F
Conductivity (Btu in. per sq ft per F per hr at following mean temperatures)						
500F	3.10	2.00	1.92	1.51	0.97	0.77
1000F	3.20	2.50	2.22	1.91	1.22	1.02
1500F	3.35	3.00	2.52	2.31	1.47	1.27
2000F	3.60	3.50	2.82	2.70	....	....

*24-hr Simulative Service Panel Test; all others 24-hr soaking period. †Back-up or exposed. ‡Back-up only.

JOHNS MANVILLE JM PRODUCTS **Johns-Manville** *first in* **INSULATIONS**

What makes the SNORKEL PEN "breathe"?

Sheaffer's new Snorkel Pen created a sensation when it was introduced to the trade. Using air alone, the pen is emptied, cleaned and refilled through the filling tube of the Snorkel Pen with a one-stroke touch-down action.

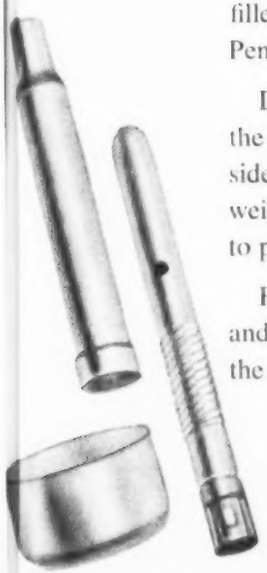
Designing the two brass "lungs" comprising the plunger-siphon mechanism called for considerable ingenuity. They must be light in weight, stiff and strong, easy to form and easy to polish and plate.

Formbrite* met all of these requirements—and more. With a metal thickness of only .0058", the 2" long cylinders are formed in multi-plunger presses in eight successive operations—*without annealing of any kind.*

Formbrite's superfine grain resulted in a harder, stronger, longer-lasting product with savings up to 50% in polishing costs.

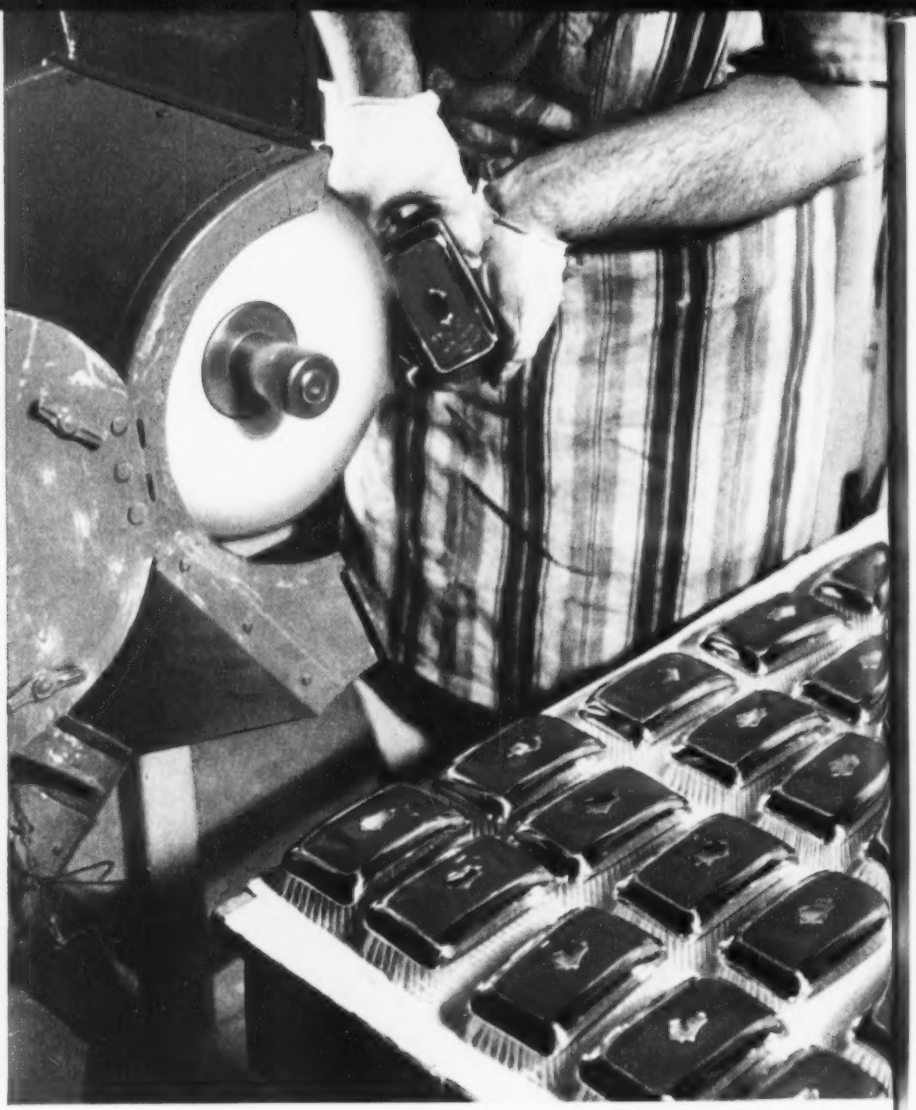
Surprisingly, Formbrite, with all the plus values it offers over conventional drawing brasses, costs no more. See the reverse page for another application of Formbrite. And write for Publication B-39, addressing The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Limited, New Toronto, Ontario, Canada.

*Reg. U. S. Pat. Off. 5295



Cups like this, blanked and formed in one operation from Formbrite strip $1\frac{11}{16}$" x .0058", are magazine-fed into multi-plunger presses. Eight successive operations produce the sleeves illustrated at top of page *without annealing*. Sleeves at left are finished, ready for chromium plating.

Formbrite
is an
ANACONDA PRODUCT
Made by The American Brass Company



You can do this *better cheaper faster*

IF THE METAL IS Formbrite

Since The American Brass Company introduced Formbrite* as a superior drawing brass, scores of stamping shops, polishing and plating rooms throughout the country have changed their thinking.

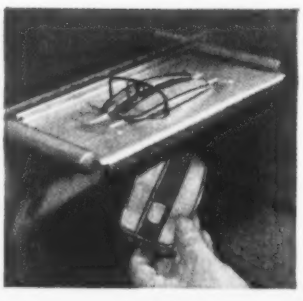
Comparative tests prove conclusively that the superfine grain structure of this specially processed forming brass means stamped and formed products that are stronger, harder, "springier" and more scratch-resistant. Yet the metal is so ductile that it can be readily formed, drawn and embossed.

Timestudies made of finishing operations have shown that a bright, lustrous finish can be obtained by a simple "color buffing" operation in half the time previously required.

That's why we say you can do it *better, cheaper and faster* with Formbrite. Millions of pounds of Formbrite sheet and strip have been produced and economically fabricated into hundreds of different products. Want a sample—and more information? Address The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Limited, New Toronto, Ontario, Canada.

*Reg. U.S. Pat. Off.

In the pressroom of a supplier, the back of a military brush is blanked from Formbrite red brass strip.



Empire Brushes, Inc., Port Chester, N. Y. produces an extensive line of military and clothing brushes with Formbrite components. At right, a decorative band is being applied.

Formbrite
is an
ANACONDA PRODUCT
Made by The American Brass Company

TARIFFS: Do You Want Them Low or High

New Congress must decide on tariff policy by extending duty act . . . Which industries want a sound tariff wall and which want no wall . . . How the sides will argue—*By T. Metaxas.*

Whether an industry is for or against tariffs depends on what products it makes, how it makes them, and where they are sold.

Policies of tariff regulation and free trade have been adopted by industry. Economic necessity often shapes them. And they will be exerted on the fresh Republican Congress of next January which must decide on another extension and modification of the Trade Agreement Act of 1934. Since TAA extension is likely and some modification is possible, it would serve manufacturers to consolidate their views on tariffs and then make them felt.

Bones of Contention—The issues will be: (1) Consistent pursuit of an unrestricted or free market through tariff deals with foreign countries. Executive tariff authority would remain with the President, as opposed to (2) Maintenance of a continuing and flexible tariff to safeguard the American market for American manufacturers. The power of duty determination would revert to a more potent Tariff Commission.

Participants in this sometimes extravagantly worded debate which promises world prosperity on one hand and an economically ruptured America on the other are lining up their logic for Congress.

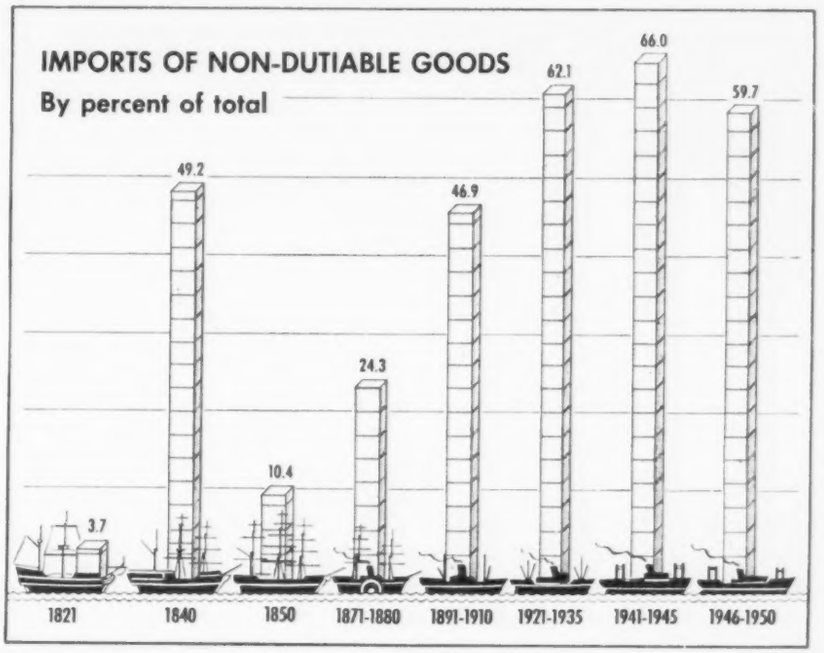
Those industries generally favoring unrestricted trade have such fabulous mechanization in their mass production that high American costs of labor are offset. A free market is wanted to unburden their surplus goods and get raw materials. These expanded industries feel they can compete anywhere on earth.

Costly Manhours—That group seeking continuing tariff protection wants to preserve the home market against unfair foreign competition, methods, and very cheap foreign labor. Inherent in the manufacture of their products is the use of proportionately more manhours per unit. Mechanization has only partially been able to offset high wage costs.

Today relatively few industries seriously suffer because of high imports. However, protection is sought against future competition and depressed economic times. A flexible and scientific tariff should shift to fit the need and create fair price competition with imports, they say.

The systematic destruction of America's high tariffs began with the Trade Agreement Act of 1934—really an amendment to the Smoot-Hawley Tariff Act of 1930. TAA gave the President the right to enter foreign trade agreements and to lower or increase duties up to 50 pct. How the tariff trend went depended on interpretation—and the Democratic regimes chose the downward path.

The TAA permitted our entrance into the General Agreement on Trade and Tariffs, an international tariff negotiating body. A most-favored-nation clause automatically extends to all member nations any tariff privileges negotiated by any two parties. We can wriggle clear of specific duty agreements but the other side can impose equivalent retaliatory duties.



High Tariff—Under the 1930-33 period of Smoot-Hawley, average ad valorem equivalents of U. S. duties on taxable imports were 52.8 pct. As of Aug. 1, 1951, this rate had fallen to 12.5 pct. Not only that but almost 60 pct of today's imports get in free. The U. S.

now cannot be called a high tariff country.

The major premise of the "free traders" is that overall American industry has reached such maturity it needs no tariff protection. To impose tariffs is to restrict trade and safeguard tired industries from their own inefficiency. This is contrary to the principle of competition, lowering the world's standard of living and promoting narrow, walled markets, they believe.

For example, the tariff system in Europe has made a large accessible market unavailable to industries there. Mass production of the American stature has been impossible.

They claim free trade would bring more imports to the U. S., make it possible for more exports. The dollar trade gap between foreign nations and America might be narrowed by permitting others to earn our money. Charity shipments abroad waste our substance and create higher taxes.

Perpetual Motion — Only the U. S. can be the aggressor in building unrestricted trade, say the free traders. No one else is economically capable. And to do so our tariff system must be lowered wherever possible. To retain it permanently is to make it self-perpetuating.

America is reaching an era in which its expanded industries and its decreasing natural resources will make us eternal dependents on foreign imports. Heavier and heavier imports into the U. S. must be balanced by heavier and heavier exports of manufactured goods. If foreign markets are closed to us then we will be spending more than we'll be taking in.

Free traders would also like to see abandonment of foreign discrimination against dollar imports. Nations overseas now set quotas to limit purchase of U. S. goods.

Scientific Tariff—Who are those seeking maintenance of protective tariffs? An influential group are members of the American Tariff League. They propose a flexible and scientific tariff. ATL believes the economic muddle of the world is not easily solved.

Wholesale concessions in trade pacts would be premature, in any case, and would leave us vulnerable to unfair competition. Tariffs are the mildest and most impartial regulators of trade in a world where far more devious devices are used, ATL contends.

ATL opposes the current rigid tariff system. Rates set by agreement cannot be changed until the danger point is reached. Aim of a flexible tariff would be merely to make foreign goods competitive with home products.

Import Gap — The tariff, says ATL, should protect against desperation dumping of imports. It must offset much cheaper wage rates and unfair and monopoly selling. Duties should protect the important diversity of American production and industries essential to war.

ATL maintains the American high standard of living is at stake. Claims that the dollar gap is undermining Europe brings this reply: America can import so much and no more. It is importing as much as it needs, tariffs or no tariffs.

And just how much of a disparity can there be between our exports and imports when it's considered a great part of our exports are free? For that portion there is no drain on Europe's dollar reserves. In any event, imports are determined not so much by tariffs but mainly by America's needs.

Middle of Road—Straddling the fence is a group which does not subscribe fully to either attitude.

This group realizes that swift expansion of free trade is impossible even if desirable. European nations are generally not able to participate beyond a certain extent. Until the time's propitious a moderate tariff system is needed.

Free trade should come through long-term evolution — with the U. S. as the hard-headed protagonist. Some middle-of-the-roaders believe that if the American productive plant were turned loose in a free market the world would soon belong to Uncle Sam. For this reason, Europe and others fear economic domination by the U. S.

European motive in seeking free trade is the need for dollars—and we can't buy all they must sell us to balance their books. Some foreign countries are only now starting on the road to industrialization. A free market would destroy young industries, it's argued.

Restrictive Gimmicks—Although European countries strive for that low tariff look, in many instances it's just gloss. They can detour around GATT agreements on keeping tariffs fixed by imposing embargoes, quotas, and controlling exchange. Result is letting in just so many imports—and no more.

Historical Traffic Levels

On total imports, over the last 40 years, the average ad valorem equivalents of U. S. duties have been:

PERIOD OR YEAR	Average rates on . . . DUTIABLE IMPORTS	FREE AND DUT. IMPORTS
1913-22 Underwood Act	27.0 pct	9.1 pct
1922-30 Fordney-McCumber Act	38.5 pct	14.0 pct
1930-33 Hawley-Smoot Act	52.8 pct	17.7 pct
1939 Hawley-Smoot Act	37.3 pct	14.4 pct
1949 Hawley-Smoot Act	13.8 pct*	5.7 pct*

* Percentage of customs receipts to value of imports.
(Source: U. S. Tariff Commission, U. S. Dept. of Commerce.)

WAREHOUSES: Expand With Demand

Growth of steel needs means growth in distribution . . . Lack of personnel and working capital plus short inventory are main hurdles . . . Warehousemen confident—By K. M. Bennett.

Growth of the warehouse industry to meet the expanded steel needs of the nation has lost none of its post-war momentum.

Another link in the chain of the many new warehouses will be that of U. S. Steel Supply Co. It will open its fifteenth warehouse at Houston, Tex., on Dec. 1. Expansion of the Houston metalworking industry has been on the upsurge for decades. In 1920 there were but 62 such plants. Today the number has risen to 321 (see THE IRON AGE, Nov. 20, 1952, p. 65).

Other Plans — Warehousemen elsewhere have the same confidence for a strong and continuing business. At Chicago, Caine Steel Co. will add 130,000 sq ft in 1953. Another firm has scheduled for early 1953 a warehouse to serve the machine tool and farm equipment markets west of Chicago. Atlantic Steel Co. recently opened a new warehouse in Atlanta, Ga.

Milwaukee will get a warehouse of 125,000 sq ft and for the second quarter next year one of the small chains plans a new Philadelphia plant. A Chicago warehouse is being expanded by 94,000 sq ft. At Cincinnati an additional 50,000 ft will be built.

Chief deterrents to expansion at an even faster clip appear to be lack of personnel (both supervisory and skilled), free working capital, and short inventory. Of the three, inventory is proving the hardest nut to crack. "You've got to have steel to sell steel," was one warehouseman's comment.

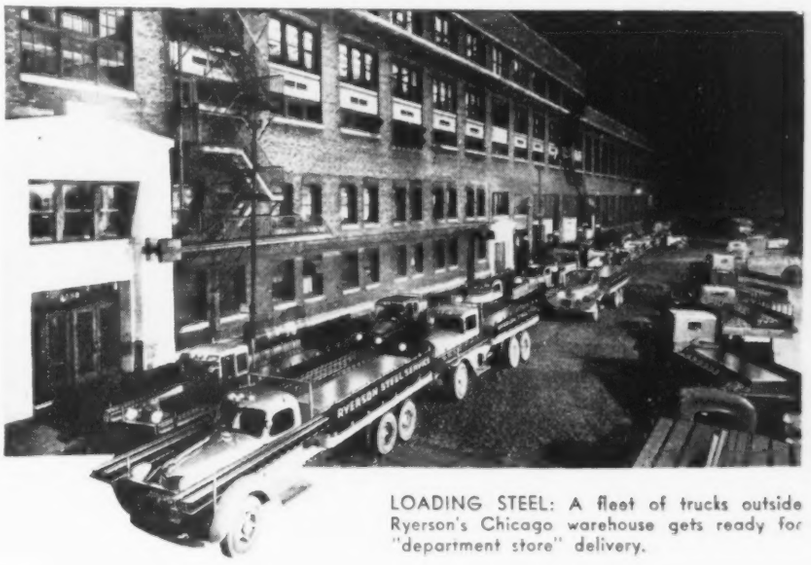
Not Whole Story — Warehouse stocks have been running at 40 pct of normal levels. Yet even the 40 pct is an inadequate statistic. Cold-rolled sheets, a bread-and-butter item, were below 10 pct of normal supply in a warehouse with overall inventory of 45 pct.

A warehouseman who leans heavily on cold-rolled strip figured that his inventory on that item ran just over 10 pct. His overall inventory "is 30 to 40 pct." Rounds and bars over 1.5 in. are in even poorer shape. A goodly portion of even a 40 to 50 pct inventory may be in slow-moving items.

Most warehouse people don't expect supply relief before mid-1953. When the steel comes, they'll be spending plenty to fill the gaps in inventory. One firm has put away over $10 million for that specific purpose. This is roughly 1.5 times the value of present stocks. It's certain that several expansions are being postponed by lack of steel to stock the new warehouses.

Quality Surveys—Where a definite expansion plan has been set up, target dates extend to 1955 and even beyond. Surveys are concise, careful, consider business levels for lean years like the 1930's and fat years like '51. They include an area's steel buying potential and are balanced against grapevine reports of planned competitive expansion. While long range planning is subject to change, it would not be dropped entirely in most instances even though business levels fell.

Areas that look particularly good are, of course, the industrial South and Southwest. The East and Midwest still have considerable potential, and growth in these areas can also be expected.



LOADING STEEL: A fleet of trucks outside Ryerson's Chicago warehouse gets ready for "department store" delivery.

Shortages of working capital, siphoned off by higher labor costs, increased taxes, and the steel cost increase, have pinched the warehouse program. A half-way solution is leasing of warehouse space. Handling costs may be higher in a building not designed specifically for warehousing of steel. But leasing offers an out where capital is tight.

Heavier Warehouse Items Praised

New policies of steel and aluminum mills of delivering heavier, wider coils to warehouses has already benefited fabricators, Herbert Barchoff, executive vice-president, Eastern Brass & Copper Co., Inc., said in New York last week.

Distributors who have retooled to handle larger raw material units save the fabricator time and money handling and pre-fabrication preparation of their orders, he stated.

ALUMINUM: Weld Tubes From Strips

Aluminum strip welded into 3-in. irrigation tubing . . . New machine automatically arc-welds in inert gas shield . . . Expansion planned . . . Patent pending—*By W. V. Packard.*

Nearly 3 years of engineering development began paying off for a small, Spokane, Wash., firm recently when it started commercial production of welded-seam aluminum tubing. The new product caught on quickly, finding a ready market in West Coast irrigation projects.

The enterprising young firm is Aluminum Supply Co. Its tubing is produced from aluminum strip which is arc-welded in an inert gas shield. An expansion program now underway will increase its capacity four-fold. Patent on the process is pending.

How It Happened—The story of this company is dramatic evidence that small firms can still thrive and grow, despite the many hurdles that must be cleared. In this case the ingredients were vision, management, and engineering. The result is a new product finding a ready market.

Aluminum Supply Co. was formed in 1949 by F. B. Cooper and K. M. Holman for production of aluminum building materials and roll-formed shapes. It became best known for original fabrication of patterns of rafter length aluminum roofing sheets.

But strong demand for light weight aluminum tubing interested the management. Messrs. Holman and Cooper became intrigued with the possibility of developing a welding process which might expand their operations into this field of insistent demand.

More than 2½ years later, after hundreds of hours of engineering and development, their faith and efforts were rewarded with success. They manufactured and sold their first thinwall, welded-aluminum irrigation tubing.

An electric-arc welding machine of their own design and construction is now turning out the 3-in. welded-seam tubing at the rate of 27,000 ft per day, according to Mr. Holman.

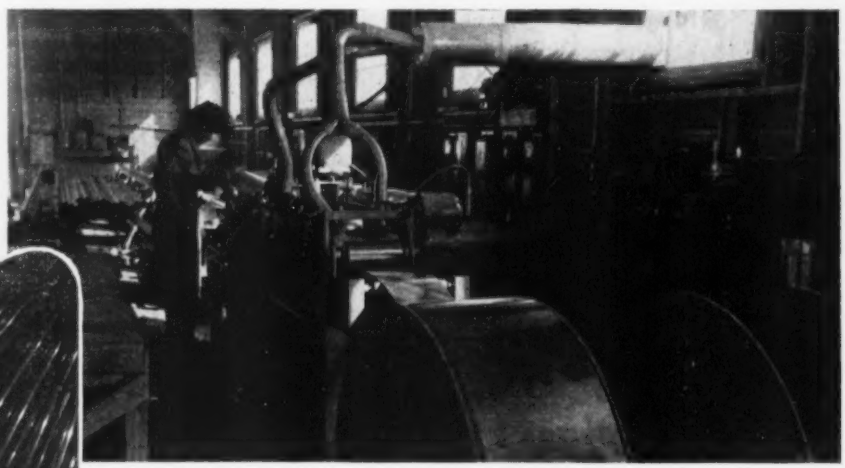
Production Steps — Production is accomplished in this manner: (1) Aluminum sheet stock is slit into strips of proper width. (2) Strips are submerged into tanks for pre-heating. (3) They then enter the rolling mill where they are formed into tubular shapes. (4) Shapes thus formed are seam-welded automatically by electric-arc method. (5) Welding is made possible by introduction of an inert gas which prevents atmospheric contamination of the aluminum. (6) The tube is then sized and cut to desired length. (7) Finally, each length of tubing is hydrostatically tested.

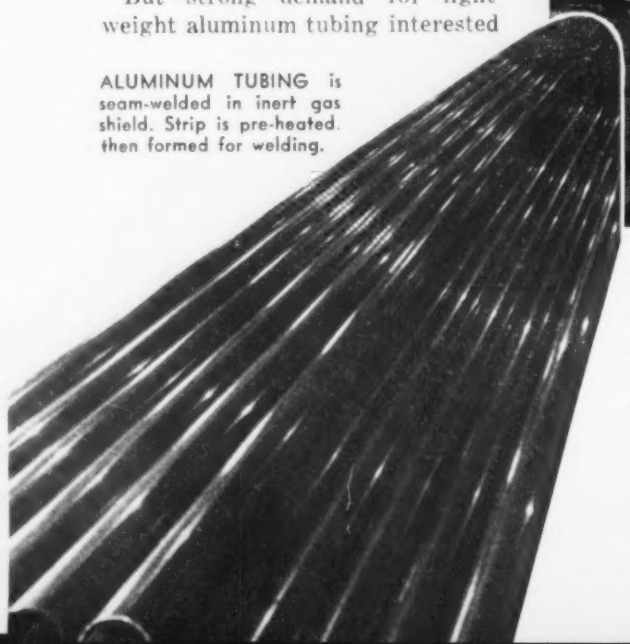
Expanding — Close control of the weld assures a smooth finish. There is neither an outside bead nor an inside flash on the tube. And uniform wall thickness is maintained along the welded seam.

The tubing is strong, too. When submitted to hydrostatic testing, it withstands pressures up to 1250 psi.

With one machine the company is presently producing 27,000 ft of 3-in. tubing per day. Within the next 6 months capacity is expected to be boosted approximately four-fold, as four additional machines (now being built) are completed. The new machines will weld 2, 4, 5, and 6-in. tubing, thus completing the range of sizes from 2-in. to 6-in.

For the present, at least, the management does not contemplate licensing or otherwise selling rights to the machines. Present efforts are concentrated on completing the four additional machines and expanding other facilities.





ALUMINUM TUBING is seam-welded in inert gas shield. Strip is pre-heated, then formed for welding.

The idea of welding aluminum in an inert gas shield is not new. But Aluminum Supply is believed to be the first firm to produce and market a welded-seam aluminum tube. Its high-speed production line, aided by pre-heating tanks, should be a distinct advantage in serving a ready market.

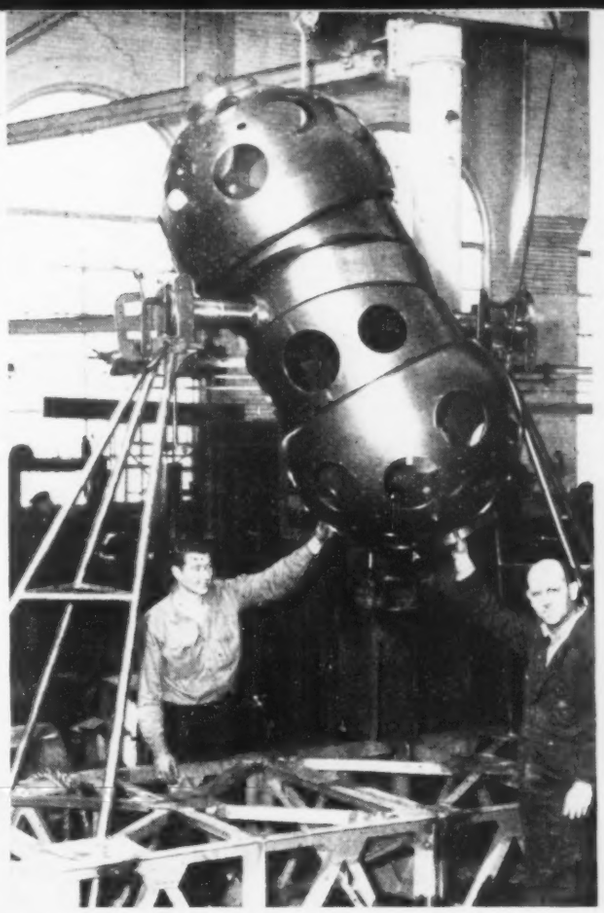
Coast Shipyard Helps Stargazers

San Francisco's new Alexander F. Morrison Planetarium is unique in that, among other things, it contains the first planetarium projector to be made in the United States. All other projectors in this country—and only seven cities have major planetariums—were made by Carl Zeiss Co., Jena, Germany. Zeiss's Jena plant is now in Red hands.

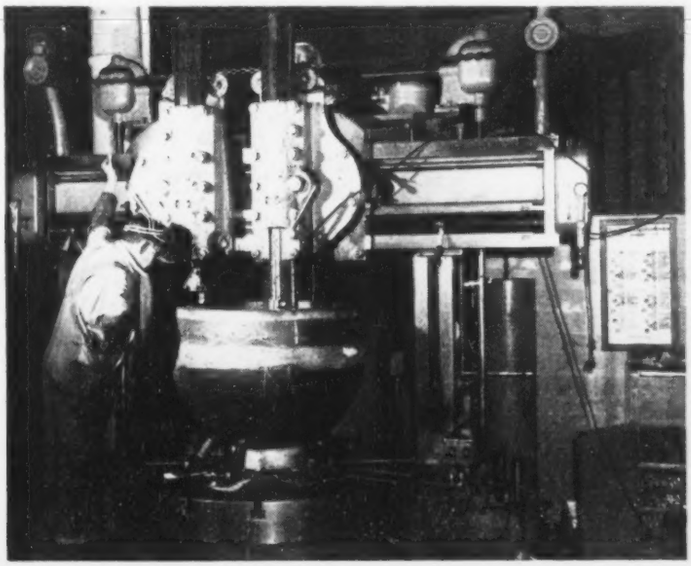
An important step in manufacture was precision machining of castings for the unit. Parts, some of them 40 in. in diam, had tolerances well under 0.001 in. Bethlehem Pacific's San Francisco Shipyard machine shop handled the job.

Work included machining surfaces of two spherical star projector carriers and boring 15 9-in. holes in each. One side of each sphere, which is open, was machined to fit a circular ribbed plate.

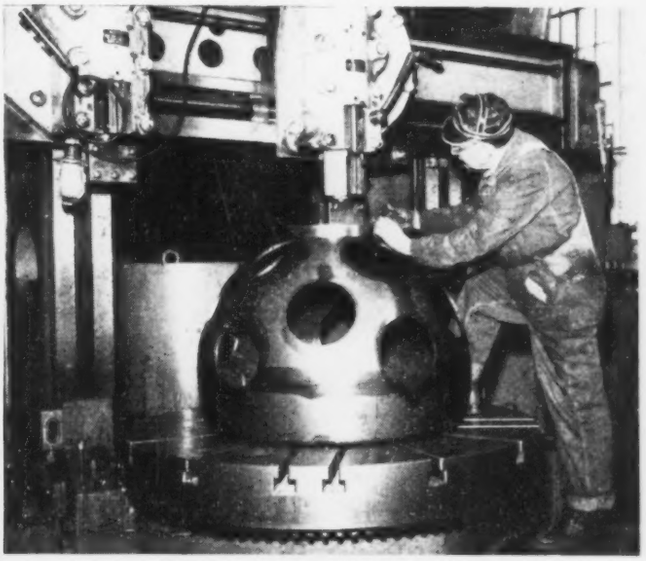
A steel inclination casting was shaped to fit a ball bearing, the inside of which is fitted to another circular ribbed plate. Opposite side of each casting was machined to fit other ball bearings, which in turn were fitted to a central ring.



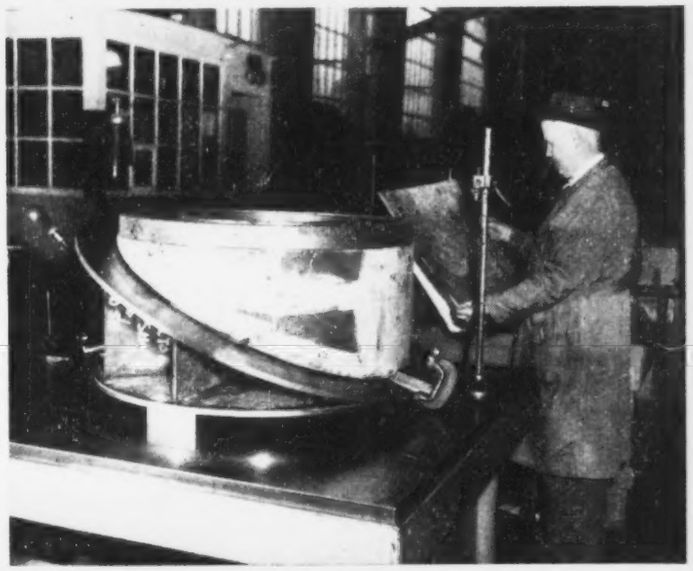
Machinists inspect planetarium projector after assembly in shop.



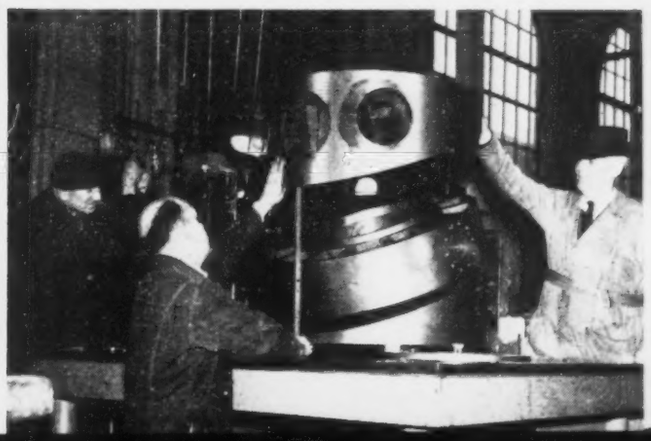
Facing and boring projector carrier to fit inclination casting.



Boring a hole for the base plate in one of the two projector spheres. Below, machined central and inclination castings are assembled.



Special fixtures are used to check accuracy of inclination casting.



International

DEVELOPMENT:

Plan to tap mineral resources of Sahara Desert advanced by French.

France is considering a plan to transform the wasteland of the Sahara Desert into one of the world's richest mineral sources and perhaps even make it a major industrial center in the decades to come.

The plan will be presented to the French parliament by a committee of political, military and scientific leaders, reports Overseas News Agency. In addition to long-term development projects, the plan calls for a change in present political and legal status of the Sahara.

Coal—On the basis of recent investigations, the committee believes the Sahara may contain fabulous mineral resources. Coal is reported to be abundant, in seams as thick as those found in Pennsylvania and Poland. Much of it is said to be mixed with iron ore.

Precious strategic minerals, such as wolfram, cobalt, tin, copper, aluminum, antimony, asbestos, molybdenum, nickel, zinc and lead are also reported plentiful. And there are indications of uranium and oil deposits.

Ownership Problem — Before France can scoop up any of these treasures, it must establish ownership of the Sahara. The government, for administrative purposes, once assigned chunks of the desert to the five surrounding countries—Algeria, Morocco, Tunisia, French West Africa and French Equatorial Africa. Fearing that these countries may someday gain independence and try to keep their assigned areas, the French hope to annex the area.

Mineral ore prospecting in the Sahara is already growing. But the committee regards this as a mere trickle compared to the activity that would result if the area were unified and brought under permanent French administration equipped to develop the area at a more rapid pace.

IRON: Direct Reduction Boosts Purity

Arata concludes tests on commercial feasibility of high purity iron by direct reduction . . . Heats average 99.94575 pct Fe . . . Military, electronic uses seen—By J. B. Delaney.

Arata Metallurgy, Inc., Chicago 37, has concluded a series of test heats indicating commercial feasibility of a process for production of iron approaching the ultimate in purity. (THE IRON AGE, Nov. 20, 1952, p. 72.)

The test heats were made in a 6-ton basic lined electric arc furnace leased from Ohio Steel Foundries, Lima, Ohio. Heats were supervised by Dr. V. Arata, president of Arata Metallurgy, who developed the process, and who has been producing the high-purity iron commercially in a 1-ton furnace in Italy.

Four test heats were made. In the first three, Alan Wood magnetite concentrate ore (about 71 pct Fe) was used, along with a carbonaceous reducing agent and lime flux. The heats analyzed 99.94 pct, 99.968 pct, and 99.974 pct Fe, respectively. Charge material for the fourth heat was McIntyre magnetite concentrate containing 57 pct Fe, and 10.6 pct TiO_2. This heat analyzed 99.901 pct Fe.

An Arata spokesman said iron of higher purity than the test heats can be produced under the process.

Low Power — Heats in which Alan Wood ore was used ranged from 5 hr 40 min to 6 hr 42 min. No time was given for the fourth heat. Starting with a cold furnace, power consumption was less than 2000 kw-hr per ingot ton of iron. Recovery on Alan Wood ore was 85 pct.

Dr. Richard S. Cole, Chief, Iron and Steel Div., Munitions Board, who observed the test heats, foresaw defense possibilities for the high purity iron. He added that the metal could be used to conserve strategic materials in an all-out defense effort.

It has been used successfully in one direct military application.

In Italy, the metal has been used as a magnetic material in electronic equipment and to make rotating bands for artillery shells. Iron powder is another probability. It could be used in place of copper in some applications.

Armco Ingot Iron, which has been produced commercially in the U. S. for over 30 years, has been used as a base material for galvanized products and as motor bases. A typical heat of Armco Iron analyzes 99.91 pct Fe. Armco also makes a high purity iron for magnetic purposes.

On the basis of the test heats, Arata engineers are convinced the metal can be produced competitively from a cost standpoint. They predicted that power consumption per ton will be reduced when larger furnaces are used on a continuous basis.

In preliminary physical tests, a hollow riser from a casting was forged into a solid 1-in. square bar. In a 180° bend test at room temperature, the bar did not break or tear.

The metal is scheduled to go to Watertown Arsenal, Watertown, Mass. It is estimated that a carload of ore will yield about 10 tons of ingots which will be rolled into sheet and tubing for further tests.

Ore Treatment Process Developed

A new and revolutionary ore beneficiation process applicable to potash and phosphate as well as to many other types of ores has been developed by International Minerals & Chemical Corp.

Neither re-agents nor water are used. The dry beneficiation method has been named the LeBaron-Lawver Process. The new method of refining ore was developed under the direction of Dr. Paul D. V. Manning, vice-president, research, and Dr. I. M. LeBaron, director, research laboratories.

New Plant—A new and larger pilot plant will be built at the present Carlsbad Refinery to operate continuously treating semi-commercial quantities of potash by means of the new method. Plans are also being developed for another shaft and mine on International's new ore body in the Carlsbad basin.

In the dry beneficiation process the ore is ground, dried and given a simple and inexpensive treatment, after which the ground ore is passed between electrodes. As the treated ore passes between the electrodes it separates into various minerals.

Arata Iron Test Heat Results

CHEMICAL PROPERTIES

	No. 1	No. 2	No. 3	No. 4
C	0.017	0.016	0.013	0.027
Mn	0.01	none	none	trace
P	0.0008	0.001	0.0008	0.0005
S	0.009	0.011	0.008	0.055
Cr	0.01	none	none	none
Mo	0.006	0.004	0.004	0.002
Si	none	trace	trace	0.015
Ni	none	trace	trace	none
Time	5 hr 40 min	6 hr 42 min	6 hr 15 min	

Alan Wood ore was used on first three heats. McIntyre ore on the fourth.

PHYSICAL PROPERTIES

	Forged	Forged & Heat Treated
Yield Point, psi	17,000 to 21,000	14,000 to 18,500
Tensile strength, psi	40,000 to 42,500	38,000 to 41,000
Elongation in 5 diameters, pct	40 to 45	50 to 55
Reduction of area, pct	65 to 70	75 to 80

STEEL: Capacity Upped 7.2 Million Tons

Capacity beginning next year will be about 16 million net tons . . . Early next year expansion will near 120-million-ton goal . . . Midwest and East expand most—*By J. B. Delaney.*

Steel mills in the U. S. by year's end will have installed almost 7,250,000 tons of new ingot capacity during 1952, increasing national capacity to approximately 116 million tons.

Before the new year 1953 is very old, capacity will be within reaching distance of the 120 million-ton goal established unofficially in early 1951 under the spur of defense requirements, fast tax amortization, and industry confidence in a continuing civilian demand for steel.

More Next Year — Included among this early-1953 capacity will be 1.2 millions at the new Fairless Works of U. S. Steel Co. Some 600,000 tons of capacity was to be brought in at this plant during last quarter of this year.

Other new capacity scheduled for 1953 includes Pittsburgh Steel, 325,000 tons due to openhearth furnace enlargements; Detroit Steel., Portsmouth Plant, New Boston, O., 750,000 tons, 4 new 250-ton openhearths; Tennessee Coal & Iron Div., Fairfield, Ala., 200,000 tons, openhearth enlargements. National Steel Corp., also will bring in new capacity next year. Detroit Steel is scheduled to light a 1400-ton blast furnace at Portsmouth about Feb. 1.

Crane Shortage Hurts—One fly in the expansion ointment has been extended deliveries on cranes, charging machines and other auxiliary equipment. Several companies report they have been unable to fully utilize new capacity due to inability to obtain this equipment. Crucible Steel estimates it will not reap full benefit of expanded capacity until third quarter of '53 for this reason.

Not usually figured in estimates of the effect of last summer's 2-month steel strike is the loss due to delay of expansion programs. Some companies set the loss at one day for each day of the strike. A number of programs scheduled for completion this year have been extended into 1953.

Decontrol Argument—New capacity, completed and in the offing, is a potent factor in industry arguments that most controls on steel be removed early next year. An industry task force, in making its recommendations to National Production Authority, said non-military consumers can expect 31 pct more steel in 1953 than they received this year (See p. 49.)

Of the 1952 expansion total, more than 6 million tons is represented by new openhearth capacity, largely due to installation of new furnaces but partly on account of furnace enlargements and technological improvements in operations and materials handling. Balance of the new capacity, over 1 million tons, is due to electric furnace expansion.

When final figures for 1952 are in, openhearth capacity will be over 101 million tons, an increase of 6.3 pct over capacity at start of the year, and 11 pct over capacity at Jan. 1, 1951. Electric furnace capacity will be over 9 million tons, up 13.5 pct from start of the year and 24 pct over capacity at Jan. 1, 1951.

Huge Investment—The industry's newest expansion program involves an investment of more than $4.5 billion on the basis of Certificates of Necessity approved by the Defense Production Administration. The certificates cover expansion in steel finishing capacity, coal and coke, ferroalloys and ores, blast furnace capacity, foundries, forges, and lake and river transportation as well as steel melting expansion.

Total investment for iron and steel expansion is far in excess of any other industry under the defense plan. Railroads and electric power each are over $2 billion.

Industry investment in steel works and rolling mills alone will be over $2.5 billion, of which 61.8 pct will be allowed fast tax amortization. Proposed blast furnace construction will involve spending of $651 million, while another $708 million will be spent on iron ore projects. Fast tax write-offs approximate 71.4 pct and 70 pct, respectively.

Big Gainers—Major new capacities to be brought in during the year will include 1.2 million tons of openhearth expansion at the Indiana Harbor Works of Youngstown Sheet & Tube Co.; approximately 900,000 tons by Jones & Laughlin at Pittsburgh and Cleveland; 600,000 tons by U. S. Steel at Fairless Works; approximately

New Blast Furnace Capacity in Net Tons

Company	No. of Furnaces	Annual Capacity Increase (N. T.)	Location	Operation Started
Colorado Fuel & Iron	1	45,000[1]	Pueblo, Colo.	.....
Crucible Steel	1	360,000	Midland, Pa.	Oct.-Dec.
Jones & Laughlin	1	200,000[2]	Cleveland	April
National Steel	1	560,000	Weirton, W. Pa.	Sept.
	1	560,000	Detroit	Sept.
Republic Steel	1	560,000	Cleveland	.....
U. S. Steel	1	600,000	Morrisville, Pa.	Dec.
Youngstown Sheet & Tube	1	580,000	East Chicago, Ind.	[3]
TOTAL CAPACITY	34,650,000			

[1] Modernization.
[2] Rebuilt.
[3] Due early in 1953.

800,000 tons by Bethlehem; 800,000 tons of openhearth and electric furnace capacity by Republic; 504,000 tons of electric furnace capacity by Northwestern Steel & Wire Corp. at Sterling, Ill; 550,000 tons of openhearth by Lone Star Steel Co., Lone Star, Tex., and 750,000 tons of new openhearth capacity by Inland Steel at Indiana Harbor. Youngstown expansion at Indiana Harbor was offset by scheduled elimination of 330,000 tons of bessemer capacity.

High Rate—The fact that a major part of the 1952 expansion is already in production explains the record operating rate of the industry since the steel strike ended. Industry operating rates are based on capacity at last Jan. 1 of approximately 108.6 million tons.

Geographically, over 3 million tons of new 1952 capacity is being brought into production in the Midwest, while over 2.5 million tons is scheduled for the East.

New Openhearth and Electric Steelmaking Capacity in 1952

(By Company, Type of Furnace and Location, in Net Tons)

Company	No. of Furnaces	Rated Capacity per Heat (N. T.)	Annual Capacity Increase (N. T.)	Location	Furnace Builder	Operation Started
OPENHEARTH FURNACE						
Bethlehem Steel			800,000			
Colorado Fuel & Iron			165,000	Pueblo, Colo.	Self	Oct.-Dec.
			26,570	Claymont, Del.	Self	
Crucible Steel	8	165	105,000[1]	Midland, Pa.	Self	Oct.-Dec.
Inland Steel	4	250	750,000	Indiana Harbor, Ind.	McKee	Sept.-Dec.
Jones & Laughlin		250	755,000[4]	Pittsburgh	Loftus	Jan.-Apr.
Laclede Steel			12,155[2]	Alton, Ill.	Self	
Lone Star Steel	4	200	550,000	Lone Star, Tex.	Rust	Dec. 31
Midvale Co.	1	100	49,291	Philadelphia	McKee	March
Pittsburgh Steel	3	250	163,000[3]	Monessen, Pa.	Self	Nov.-Dec.
Republic Steel	4	275	672,000	Cleveland	Freyn	
			121,000[5]			
U. S. Steel	3	275	600,000[6]	Morrisville, Pa.		
	2	210	300,000[4]	Fairfield, Ala.		
	1	225	160,000	Provo, Utah		
Youngstown Sheet & Tube	8	250	330,000 tons retired. Net gain 880,000.	Indiana Harbor, Ind.		
TOTAL OPENHEARTH CAPACITY—6,109,017						
ELECTRIC FURNACES						
Allegheny Ludlum	3	2-10 1-10	72,000	Watervliet, N. Y.	Freyn	
Armco Steel	1	100	150,000	Kansas City	Pgh. Lectromelt	May
Atlantic Steel	1	60	100,000	Atlanta	Pgh. Lectromelt	May
Babcock & Wilcox	1	60	96,000	Beaver Falls, Pa.	Swindell Dressler	Oct.
Eastern Stainless	1	20	12,000	Baltimore	American Bridge	Sept.
Ingersoll Steel Div.	2	12	43,200	New Castle, Ind.	American Bridge	
Northwestern Steel & Wire	2	120	504,000	Sterling, Ill.	Pgh. Lectromelt	May-Aug.
Timken	3	80	Capacity 275,000. Replaced 3 openhearths. Net gain 75,000.	Canton, Ohio	American Bridge	Sept.-Dec.
Vanadium-Alloys	1	12.5	15,000	Monaca, Pa.	American Bridge	Dec.
TOTAL ELECTRIC CAPACITY—1,067,200						
TOTAL NEW STEELMAKING CAPACITY—7,176,217						

[1] Furnaces enlarged.
[2] Technological changes.
[3] Furnaces enlarged.
[4] Estimated.
[5] Includes electric furnace and openhearth reconstruction and technological changes.
[6] 1.2 million tons more due in early in 1953.

STEEL:

Building of LeTourneau mill slowed but two furnaces put in operation.

Still waiting in the wings is the Longview, Tex., steel mill being built by R. G. LeTourneau, Inc., to handle plate requirements of its five plants.

Slowed by steel shortages, rolling mill difficulties and climbing costs, LeTourneau, Inc., has still managed to put into operation two electric furnaces, each with 25 ton capacity. A third furnace is scheduled for production late this year. Date for initial operation of the plate rolling mill has not been announced.

Preheated—The furnaces (as reported in THE IRON AGE, June 7, 1951) are "evolutionary," designed by R. G. LeTourneau. A preheating charging tube, 20 ft x 91 in. brings the charge to red heat prior to entry into the furnace.

When operating, the mill will roll plate to 144-in. widths and in thicknesses of 3/16 in. through 12 in. Since heavy plate in widths above 72 in. remains tight, the mill expects to be busy.

LeTourneau builds electric motors and generators for earthmoving equipment and is building its own DC electric drive for the roll. The DC generators are powered by natural gas engines and the specifications call for 8000 hp.

Small Firms Share Gear Growth

Companies with not more than 450 employees now have the opportunity of getting a share of $6 million worth of production expansion in the gear and gear drive field.

Small business was allotted a 33-pct share of the total desired expansion goal, set by Defense Production Administration, of $20 million in new capital investment, to be reached by Jan. 1, 1954. DPA has already issued certificates of necessity for rapid tax write-off for about $14 million of the total.

Particularly sought at this time is increased capacity to produce fine precision gears, gear drives, and speed changers.

Magma Seeks Additional Capital

Additional working capital is to be realized by Magma Copper Co. through sale of some 281,000 odd shares of its $10 par capital stock, according to a registration statement filed with Securities & Exchange Commission.

Reconstruction Finance Corp. recently agreed to loan San Manuel Copper Corp., a Magma subsidiary, some $94 million for development of its copper holdings. One condition on the loan was that Magma would contribute $6 million to San Manuel capital from sale of capital stock.

Net proceeds in excess of the $6 million needed to retire San Manuel notes will be used for additional aid to San Manuel and to increase Magma's general financial status.

—Construction—

Housing: More Units

Private starts up, with costs down . . . Public jobs the opposite . . . No seasonal decline yet.

Most residential construction was at a slightly lower unit cost; volume of privately-financed building increased and public construction was of smaller volume.

That's the housing story for 1952, based on Washington data covering the first 10 months.

Only a seige of unusually bad weather can now prevent a larger number of housing starts this year than last. And this record probably will be reached in spite of scarcities of building materials, production controls, and earlier stiff government credit regulations.

Best guess now as to the number of housing starts for the year is from 1,110,000 to 1,130,000. Last year's total was 1,091,000 units.

Through October, approximately 966,500 new permanent non-farm type of residential units were put under construction. This was roughly 10,500 more than for the same period last year, including both private and public housing.

Decline is Late—Usually, a seasonal decline begins after September. But reversing this trend, October starts were reported at 101,000 —3000 more than September and 11,000 more than in October last year.

Early reports for November indicated that in almost all parts of the country the seasonal decline had not yet set in. New home construction was going on at a rate equal to or greater than the October rate.

This is in excess of the annual rate—1.2 million—which if continued for 3 months would permit the Federal Reserve Board to put Reg. X into effect once more. But since winter is still ahead, officials are giving little thought to credit curbs.

Indications are that the 1952 trend is toward lower cost construction. Total dollar volume through October was estimated at $8.6 billion, running $100 million behind last year, despite the increase of more than 10,000 starts.

Less Cost

None of these figures include farm construction, which is not broken down by types of building. Nor do they include figures for additions and alterations to existing homes.

Farm Building Off—Farm construction for the period amounted to $1.5 billion, down slightly from last year. Home owners are estimated to have spent $875 million for renovation, exclusive of maintenance, which is up by $90 million from the 10-month period last year.

Total expenditure for public housing construction was up by $90 million from last year. However, the $550 million spent from public funds so far this year placed only 49,000 units as compared with about 67,000 last year for $460 million.

On the other hand, private housing is up 29,000 units while nearly $200 million less was spent—which should point up a lesson of some kind.

Steel Inquiries and Awards

Fabricated steel awards this week include the following:

525 **Tons,** Fond Du Lac, Wis., bridges to Worden Allen Co.

430 **Tons,** New Orleans, La., St. Bernard Ave. overpass for city of New Orleans, to American Bridge Div. of U. S. Steel, Birmingham, Ala.

300 **Tons,** Lincoln, Neb., oil storage tanks to General American Transporation Co.

Fabricated steel inquiries this week include the following:

1050 **Tons,** West Chicago, Ill., chemical plant for Lindsay Light and Chemical Co.

1000 **Tons,** Boston, Mass., new Northeastern University gymnasium and physical education building consisting $1,750,000, on Huntington Ave., Back Bay, through John A. Volpe Construction Co., Malden, Mass., to Groisser and Shlager Iron Works, Somerville, Mass.

771 **Tons,** Allegheny County, Pa., alterations to existing structures, construction of new substructure and superstructure. Pennsylvania Dept. of Highways, Harrisburg, Pa. Bids to Dec. 19, 1952.

300 **Tons,** Newburyport, Mass., warehouse for Hytron Electronics and Radio Corp., through Leslie R. Porter Co., Beverly, Mass., to Albert O. Wilson Structural Steel Co., Cambridge, Mass.

175 **Tons,** Cranston, R. I., new Parkview school through Gilbane Building Co., Providence, R. I., to Albert O. Wilson Structural Steel Co., Cambridge, Mass.

Reinforcing bar awards this week include the following:

190 **Tons,** Libertyville, Ill., high school, to Carroll Construction Co.

TOOLING: Different For Planes

Short runs, high precision make difference between auto and aircraft tool and diemaking . . . Defense boom has given birth to many independent shops in West—By *T. M. Rohan.*

In Los Angeles they give tool and diemaking a new twist. Detroit will spend 6 months and $40,000 on an auto body die and sweat for weeks to cut half a minute off production time. But then they'll use it for 1 million cars. In Los Angeles they always need it yesterday. They rarely spend more than $2000, throw it away after 100 uses.

Airplane tool and diemaking is strictly a hopped-up affair these days. Production runs are seldom over 100 or 150 parts. Reason: There are seldom more than that many planes of any one type made at present. Even when runs are longer, design changes make tooling obsolete unlike the automotive industry.

Plane body dies are also much more precise than, say, autos. Allowable variations on exterior fuselage contours are only 0.002 in. per 5-in. length. Instrument checking is required while car body variations need only be undiscernable to the eye.

High Tool Pct — Number and complexity in aircraft tooling is also out of proportion. Convair's R3-Y flying boat, for instance, will need about 50,000 separate tools. The industry's rule of thumb is that 10 pct of total cost goes into tooling.

Potential production runs, rates and elapsed time in use govern die design. If a die will be used only 100 times in a year, a form block or drop hammer die is used. This takes some extra time to make but not enough to offset the cost of a mechanical die which would be good for 1000 or more parts. Fact that speed is secondary to precision is one redeeming factor.

The aircraft program has caused many independent tool and die shops to spring up in southern California, at least 20 in the Los Angeles area alone. Most of these are sorely overloaded but the lure of heavy overtime pay draws many of the best toolmakers.

Aircraft manufacturers shun overtime to keep costs down but will pay outside shops a premium for rush jobs. Planemakers cultivate good will in these shops by giving them jobs in slack times to get return favors at other times.

Good Labor Short — Machinists and tool and diemakers with experience are more than welcome. Lockheed with a total Burbank employment of 29,793 has 2961 in all phases of tool designing, making, inspecting etc. They could use 100 more.

Vacancies are filled by recruiting from other areas of the country and training currently employed men for higher skills. But both programs are only moderately successful. Lockheed's recruiting drives in the Midwest brought in many tool engineers but few highly skilled workers. Detroit craftsmen, for instance, generally get better rates at home although the lure of sunny California without traditional Detroit layoffs is strong for some.

Lack of a housing guarantee has been a major drawback for Convair. This company, which has a tooling department of 1900 out of a total work force of 21,000 at San Diego, is currently recruiting in New York, Boston, Chicago, and Memphis. Planemakers generally have a gentlemen's agreement, not to pirate each other's labor.

But Workers Drift—Alternative to recruiting is to develop workers already employed and most plants go in heavily for on-the-job and classroom training. In larger plants up to 100 may be on full-time training while 2000 get on-the-job tutelage.

Labor

William Green Passes

William Green, president of the American Federation of Labor, passed away at his home in Coshocton, Ohio, near the coal mines in which he worked as a boy. In poor health for a number of years, Mr. Green died of a heart attack. He was 82 years old.

Mr. Green headed the AFL since 1924 when he succeeded Samuel Gompers. A bitter opponent of dual unionism, he still had hope of repairing the split between the AFL and Congress of Industrial Organizations at the time of his death.

Born in Coshocton, Mar. 3, 1870, Mr. Green quit school early to work in the coal mines. In 1890 he joined the United Mine Workers. For a number of years he participated in Democratic politics and served two terms in the Ohio State Senate.

An aggressive and early foe of communism, Mr. Green was also responsible for binding the AFL's millions of workers to an effective no-strike clause during World War II. Author of a book, *Labor and Democracy*, in 1930 he received the Roosevelt Memorial Assn. Medal for service in maintaining industrial peace.

STEEL: Task Force Asks CMP End

Recommends end of all CMP controls except military by Apr. 1 . . . Ask open-end CMP immediately . . . Directives and priority for military and atomic needs to stay—By *A. K. Rannells.*

The steel industry has asked National Production Authority to scrap all CMP controls, except for military and atomic energy priorities, not later than Apr. 1.

It recommended, however, that NPA retain its system of production directives as assurance that defense production needs in tight supply categories of steel products would be met.

The proposal, as expected, follows basically along the lines of a plan submitted by the industry last spring prior to the 54-day steel strike. Officials said the recommendations would be taken under advisement and submitted to the Production Policy Committee about Nov. 24.

Open-End CMP—Meanwhile, Defense Production Administration is going ahead with full programming of controlled disposal of April-June steel production. Second quarter allotments are expected to be issued about Dec. 15.

As a prelude to abandonment of all but priority controls, the industry recommends an immediate open-ending of CMP with respect to steel products. This would permit mills to sell on open market any steel left over after expiration of lead time for CMP steel.

At the same time, steel users would be permitted to buy any of this steel they could get and to use it in excess of CMP production schedules without charging against their allotments.

Recommendations went further than earlier suggestions by industry in that they proposed that construction projects be allowed to pick up any of this free steel without regard to construction schedules.

Industry is convinced now in view of rapid recovery from the strike, together with new capacity coming into production, that such a step will not dislocate the civilian economy. The task group's report supports this thinking and says that there would be no shortage of consumer goods from lack of steel.

Over the Hump—It is argued that by the end of first quarter mill rollings, some 95 pct of steel mill requirements for the industrial expansion program will have been shipped. From then on, it is held that the steel plants can take care of defense requirements with simple priorities and the directives for assuring particular categories of products.

Just in case something should go sour, it is further proposed that a special assistance group be established within NPA to handle any chance bottlenecks involving specific projects connected with military and atomic energy programs.

A similar group, consisting of industry men, would also be named on a standby basis to assist in quick solutions to such problems, if they developed.

Warehouses would be taken care of during the second quarter by continuing distribution on the basis now authorized in order M-6A with maintenance of inventory restrictions on controlled steel products during second quarter.

But, the committee says, these warehouse shipment provisions as well as inventory controls should be scrapped with the beginning of the third quarter.

The proposals then provide that whenever, in the judgment of the industry advisory committee, it appears that defense requirements can be met without special assistance, all controls should go out the window including directives and setasides.

Steel Market Forecast

The steel industry task group backed up its decontrol recommendations with the following forecast of steel supply and demand during 1953:

(1) The industry can produce as much as 118.8 million net tons of ingots—if needed.

(2) No more than 14 million tons of this output will be required for military and atomic energy purposes, as now planned.

(3) This will leave as much as 104 million tons for all other purposes—one-third more than the probable 80 million tons which will have been available for non-defense uses during 1952.

Raise Coke Ceilings

OPS has approved a ceiling price increase for by-product oven coke and coal chemicals. It averages 3.75 pct and may be spread among various products. An earnings standard survey showed the need for this action.

Authorization is in Amendment 13, Supplementary Reg. 13, General Ceiling Price Reg. and is effective Nov. 21. At the same time OPS allowed pass-through of the boost in delivered costs of coking coal (mostly bituminous) occurring after Oct. 1 as a result of wage increases to the miners.

Tighten Stainless Order

NPA will soon require certification that nickel bearing stainless steel orders won't be used in violation of present restrictions, it's expected. No relief is in sight for nickel in spite of new facilities expected early next year and allocation is in the cards for a long time, says NPA.

Industry Controls This Week

Coal—Amend. 6, CPR 4 raises price ceilings on all sizes of Pennsylvania anthracite.

Coke—Amend. 13, SR 13, GCPR increases ceiling prices on by-product oven coke and coal chemicals.

Construction—Amend. Dir. 6 CMP Reg. 6 concerns non-military autho-

rized controlled materials orders for steel placed by the construction industry.

Copper—SR 125, GCPR raises ceiling prices on products in which primary copper is used. Amend. M-16 permits brass and bronze foundries to self-certify orders for copper raw materials up to certain amounts.

Exports—Amends. 3 and 4, CPR 61 require that exporters make their base period markup reports to OPS district offices and suspend price ceilings on export sales of products on which domestic ceilings have been suspended.

Pass-Through Costs — Amend. 1, GOR 35 prohibits manufacturers who have already received a metals-cost adjustment in a specific order from obtaining another adjustment under the general "pass-through" order.

Scrap—Interp. 2 and 3, CPR 5 and Interp. 1, CPR 43, 46, 47, 53, 54 and 59 concern downgrading of scrap material purchased from the government and scrap brokerage transactions.

Government Appointments

J. P. Coleman, member, National Petroleum Council, DPA;

James C. Crenshaw, director, Water Resources Div., NPA;

George R. Davis, director, Motor Vehicle Div., NPA;

Richard H. Haigh, chief, Coke & Coal Chemicals Sect., Fuels Div., OPS;

N. L. Hammond, Jr., chief, Warehouse Section, Iron & Steel Branch, OPS;

Warren Huff, acting deputy administrator and acting chairman, Aircraft Production Board and Production Committee, DPA;

Dr. Jacob L. Keller, chief, Industrial Chemicals, Dyestuffs and Pigments Sect., OPS;

George E. Meyer, director, Industrial Expansion Div., NPA;

Dr. Charles M. Mottley, director, Planning Div., Defense Research & Development Board;

Edward M. Naughton, director, Engine & Turbine Div., Industrial & Agricultural Bureau, NPA;

Joseph B. Skaptason, Chief, Agricultural Chemicals Section, OPS;

Charles F. Stanley, director, General Components Div., NPA;

Robert L. Turner, acting administrator, Defense Air Transportation Administration.

RENEGOTIATION:

Remove 60-day interval in filing to speed processing of forms.

Removal of the 60-day interval between the filing of two report forms with the Renegotiation Board is expected to permit greater speed in the renegotiation process.

Amendments to Parts 1465 and 1470 of the Board's regulations, directing elimination of the 60-day delay allowed between filing of Forms 1 and 1B, are applicable to defense contractors with fiscal years ending on or after Dec. 31.

However, a special provision states that if those contractors who must submit reports before Apr. 1 find it impossible to file both forms together they may turn in Form 1 and ask permission to submit Form 1B not later than 60 days after the due date.

Originally, the 60-day delay was allowed to give contractors sufficient time to familiarize themselves with the renegotiation regulations and assemble figures for use in completing their reports. Board Chairman John T. Koehler says that most contractors now are using procedures permitting both forms to be turned in simultaneously, and extra handling by the Board's staff will be eliminated.

All contractors still have 3 months in which to file after their fiscal years close.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Frankford Arsenal, Philadelphia.
Adapter cylinder cap bushing, var 6 itm, ORD-53-SP-142, Dec. 19.
Relay etc. S/P FCE-AA M33C M33D, var 2 itm, ORD-53-SP-138, Dec. 19.
Housing, var 15 itm, ORD-53-SP-134, Dec. 17.

Ordnance Tank Automotive Center, Detroit.
Shackle w/bushing assy, 6000, 53-601B, Dec. 12.
Regulator assy, 2628, 53-541B, Dec. 12.
Plug, 612, 53-517B, Dec. 12.
Lock assy, 100, 53-517B, Dec. 12.

Chemical Procurement District, Chicago.
Burster, well, 29100, CM1-11-021-53-38, Dec. 2.

Signal Corps Supply Agency, Philadelphia.
Clamp cable suspension, 32000 ea, 117-32CB, Dec. 17.
Charger battery 465 ea, 1147-32BB, Dec. 15.

Supply Dept. Procurement Section, Marines, Washington.
Saws, woodworking, 100 ea, 432B, Dec. 11.

Bureau of Ships, Washington.
Tube tester, 4825, 800-39133-M11, Dec. 11.

Navy Purchasing Office, Washington.
Drills, star, hand, 4868, 6819B, Dec. 5.
Shackle bomb, 1427, 6773AB, Dec. 10.
Punches, var, 800 sets, 6815B, Dec. 2.
Pliers, brake key, 6900, 6817S, Dec. 3.

Rock Island Arsenal, Rock Island, Ill.
Pin and chain assy, 1400 ea, 11-070-53-294B, Dec. 11.
Body assy, 680 ea, 11-070-53-294B, Dec. 11.
Indicator assy, 660 ea, 11-070-53-294B, Dec. 11.
Knob assy, 740 ea, 11-070-53-294B, Dec. 11.
Kit modification for M20 and M20B1 rocket launchers, 1300 ea, 11-070-53-262B, Dec. 5.
Fork-Holding, 200 ea, 11-070-52-262B, Dec. 5.
Jig-Drill assy, 200 ea, 11-070-53-262B, Dec. 5.
Punch and dies assy, 200 ea, 11-070-53-262B, Dec. 5.
Saw-Hole-assy, 200 ea, 11-070-53-262B, Dec. 5.
Metallic belt-cal 30, 1811194 ea, 11-070-53-327B, Dec. 5.

Small Arms Ammunition Center, St. Louis.
Ctg ball revolver cal .38, 419,000, ORD-23-196-53-2B, Dec. 8.
Ctg ball revolver cal .38, 200,000, ORD-23-195-53-2B, Dec. 8.

Quartermaster Depot, Philadelphia.
Buckle web belt brass, 1222200 ea, 88B, Nov. 24.

Corps of Engineers, Pittsburgh.
Clamp, wire rope, 25,784 ea, ENG 36-058-53-46B, Dec. 1.

Quartermaster Purchasing Div., Chicago.
Tubs, galley, corrosion resiststeel, 1300 ea, 53-435B, Dec. 10.

National Bureau of Standards, Washington.
Connectors, 600 ea, B1-464-53, Nov. 28.
Clip, alligator, 1000 ea, B1-464-53, Nov. 28.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Sweeper, rotary, 178 ea, $155,715, Meill Blumberg Corp., New Holstein, Wis.
Spare parts, var, $30,167, Paragon Gear Works, Taunton, Mass.
Spare parts, var, $27,670, De Vilbiss Co., Toledo.
Shell, H. E., T64, 76MM, 512000, $2,817,636, Colorado Builders & Supply Co., Denver.
Fuze, PD, M52A2, 1742000, $1,733,638, National Vendors, Inc., St. Louis.
Case cartridge M1, 618000, $10,536,900, Chase Brass & Copper Co., Inc., Waterbury, Conn.
Continental tank engines, 450, $4,007,277, AVCO Mfg. Corp., Williamsport, Pa.
Continental tank engines, 200, $1,584,822, AVCO Mfg. Corp., Williamsport, Pa.
Windshield, aluminum alloy, 149,400, $35,856, Odel Die Casting Corp., Detroit.
Gages, lot, $25,557, Greenfield Tap & Die Co., Greenfield, Mass.
Cylinder assy, 400, $55,000, Clyne Mfg. Co., Cincinnati.
Mattocks, pick, 94300, $177,284, True Temper Corp., Cleveland.
Hammers, machinist, 38000, $25,080, Fairmount Tool & Forging, Inc., Cleveland.
Conveyers, gravity roller, 685, $51,859, The Rapids-Standard Co., Inc., Washington.
Replenishment for small arms parts, 300, $37,500, Tool Industries, Inc., Detroit.
Replenishment of small air parts, 7000, $27,330, Northfield Research & Mfg. Co., Detroit.
Replenishment of hardware, 3395000, $32,445, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Replenishment of hardware, 150, $35,625, Ray Whyte Electric Products, East Detroit, Michigan.
Replenishment of hardware, 194880, $31,930, U. S. Steel, Detroit.
Circuit breakers, air, 3540 ea, $28,072, Westinghouse Elec. Corp., New York.

Industrial Briefs

Open House—More than 3000 visitors toured La Belle Works of WHEELING STEEL CORP. during an Open House held recently in celebration of the plant's 100th anniversary.

Build for Coke — WEIRTON STEEL CO., division of National Steel Corp., plans construction of a new coke plant and an extension to the present coke department at Weirton, W. Va.

Expanding — LINDBERG STEEL TREATING CO. has expanded its Los Angeles facilities. It has opened a new plant at 2910 Sunol Drive.

Canadian Rep — LEWIS - SHEPARD PRODUCTS, INC., Watertown, Mass., now is represented by Mussens Canada, Ltd., in Montreal, Quebec.

Appointed — Baker Industrial Truck Co. of Wisconsin, has been appointed exclusive distributor in Milwaukee and eastern Wisconsin, for THE BAKER - RAULANG CO., Cleveland.

New Offices—EAGLE ENGINEERING CO. has opened new offices at 18643 W. 7 Mile Rd., Detroit.

New Plant — NATIONAL MALLEABLE & STEEL CASTINGS CO. has approved a $2 million development at its Capitol Foundry near Phoenix. New plant will be built on a 27-acre site chosen several months ago.

Ordered—LEBANON STEEL FOUNDRY of Lebanon, Pa., reports its moving picture, "Steel with a Thousand Qualities," will be shown in MSA nations by Mutual Security Agency.

Philippine Steel—The first steel ingot mill in the Philippines is now operating at the MARCELO STEEL CORP. plant. The ingot mill is a unit of the steel melting and rolling plant.

Valve Factory—New factory facilities for the assembly of control valves were recently acquired at Dallas by THE FOXBORO CO., Foxboro, Mass.

Titanium Tour—The Materials Committee of the Aircraft Industries Assn. visited the titanium metal plant in Henderson, Nev., recently. The Henderson plant is that of TITANIUM METALS CORP. OF AMERICA, jointly owned by National Lead Co. and Allegheny Ludlum Steel Corp.

Distributor Named—Nielsen Hydraulic Equipment, Inc., New York, has been appointed an authorized distributor by THE PARKER APPLIANCE CO., Cleveland.

Test Equipment—METCO CORP., a newly-formed company for the development and manufacture of test equipment and related products, has opened offices and laboratories in Dayton.

Change Name — Cleveland Graphite Bronze Co. stockholders, in a special meeting recently, approved the proposal to change the name of the company to CLEVITE CORP.

Pick Dealer—CLARK EQUIPMENT CO., Battle Creek, Mich., has named Towne Industrial Equipment Co., Inc., Dallas, as its authorized dealer in 129 Texas counties.

Elected—A. W. McKinney, executive vice-president, THE NATIONAL SUPPLY CO., has been elected president of the Diesel Engine Manufacturers Assn.

Completed — GENERAL ELECTRIC CO. completed another step in its decentralization program on Nov. 25 with the opening of a multi-million-dollar plant at Linton, Ind. It will manufacture fractional - horsepower motors.

Special Meeting — BLAW-KNOX CO. has called a special meeting of stockholders for Dec. 15 to vote upon a plan of corporate simplification involving the merger of the company and its operating subsidiaries.

Relighted Ovens — American Steel & Wire Division of U. S. STEEL CO. relighted the rebuilt "B Battery" of 45 coke ovens at the Division's Coke Works.

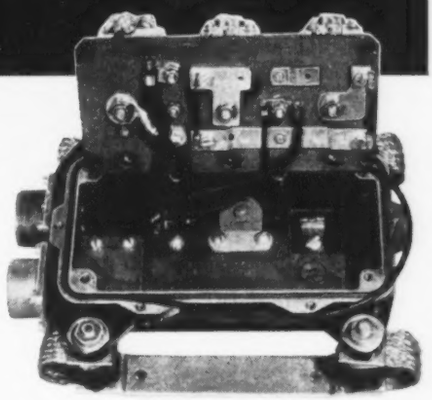
Aluminum Smelter—First 2-wings of a new aluminum smelter were opened recently for full production by AMERICAN ALLOYS CORP., Kansas City.

Company Organized — Wilfred Williams and James W. Robinson, have organized a new company, THE MIDWEST STAMPING & MFG. CO., Bowling Green, Ohio.

Zone Office — WILLYS-OVERLAND MOTORS, INC., has opened a new zone office in Chicago, to be called Willys-Overland Distributors, Inc.

Martin B-61 Matador pilotless bomber taking off. Made by the Glenn L. Martin Company, Baltimore, Md.

Jeep almost completely submerged. Can be operated in this position at about 9 miles per hour. Made by Willys-Overland Motors, Inc., Toledo, Ohio, for the Armed Forces.



Generator regulator for the 24-volt system of the submersible Jeep. This is completely waterproof and highly resistant to corrosion and fungi. Produced by The Electric Auto-Lite Company, Toledo, Ohio.

Illustrated are two of the many types of capacitors and filters made by Aerovox Corporation, New Bedford, Mass.; an important capacitor supplier to both Electric Auto-Lite and Glenn L. Martin. The unit above is the filter capacitor used in the generator regulator of the submersible jeep while the unit at the right is used in the pilotless bomber.

In the Air— On Land— Under Water—

WHERE REQUIREMENTS ARE SEVERE, CALL REVERE

The dramatic pictures on this page show two important special applications of Aerovox capacitors. One is the Martin B-61 Matador pilotless bomber. It contains an Aerovox capacitor, which has to withstand the terrific acceleration and speed of the craft. The other is the submersible Jeep. Its 24-volt electrical system is completely waterproofed, and includes Aerovox filters and capacitors for suppression of radio interference. Revere not only supplied copper and brass strip for the capacitor cases, but collaborated closely in setting up specifications, and in addition worked on a welding problem. In regard to the latter, an Aerovox Project Engineer wrote: "We have had much better welds." . . . Revere is always glad to collaborate on problems concerning copper and its alloys, aluminum alloys, and electric welded steel tube. Call the nearest Revere Sales Office.

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Sales Drop But Profits Mount

Despite loss in sales auto profits show an increase during first 9 months . . . Easing of price controls and use of less conversion steel the main factors—By *R. D. Raddant.*

After a whole list of "despites," production controls and a disastrous steel strike, the auto industry is pointing for bigger profits than it made a year ago.

Financial reports for the first 3 quarters of 1952 indicate that as a general rule a lower dollar volume of business is accompanied by bigger earnings than in 1951.

Trend toward increased profits in spite of lower sales can be attributed to relaxation of price controls. A second factor is the use of less conversion steel over the 9 month period. After the steel strike there was return to conversion practices, but only in the second half of the year.

These two factors are the major ones behind the optimistic picture indicated at the three-quarters mark. Improved manufacturing methods in many cases have also contributed to the better earnings.

Earnings Up — Of seven car builders reporting, total net earnings after taxes were $479.2 million against $453.7 million a year ago. Six companies reporting sales figures show a sales drop of approximately $246 million from the first 9 months of 1951.

These figures do not include Ford which does not reveal publicly the dollar volume of sales nor the amount paid in dividends. A financial statement filed in Massachusetts last week showed, however, that the Ford Motor Co.'s assets at the end of 1951 increased $115,081,000 over the previous year. This, of course, has no bearing on 1952 earnings.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Nov. 22, 1952	100,804*	28,538*	129,342*
Nov. 15, 1952	114,020	32,805	146,825
Nov. 24, 1951	67,319	18,994	86,313
Nov. 17, 1951	93,744	26,993	120,737

*Estimated

Source: *Ward's Reports*

K-F Loses — Kaiser-Frazer showed a net loss of $5,688,773 for the period, but reported net earnings of $344,064 for the third quarter. Profit was attributed to defense production, while automotive losses amounted to $175,094.

The following statement from Chrysler's third quarter financial statement is significant:

"The relatively improved earnings, despite reduced sales volume, continued increase in costs and higher taxes, resulted in large part from less severe Government price controls than those in effect during the first three quarters of 1951.

"Reduced use of conversion steel, which is far more costly than steel acquired in readily usable forms, also was a factor. The steel strike during the summer, however, for a time so reduced normal steel supplies that we are again compelled to buy quantities of conversion steel for consumption during the last 3 months of the year."

Following are the reports of net earnings after taxes through Sept. 30 for the reporting companies. Nash and Willys reports are through June 30 for the first 9 months of their fiscal year:

COMPANY	1952	1951
General Motors	$337,030,986	$372,790,913
Chrysler	59,661,657	50,108,179
Studebaker	9,299,511	8,799,605
Packard	3,094,515	4,922,876
Hudson	6,249,145	*967,379
Nash	8,744,829	12,735,053
Willys	5,192,963	3,393,037

* After tax refund credit of $1,055,612.

Record Rubber Use — Expanding use of new rubber products and the increased number of automobiles on the highways will bring 1953 rubber consumption to near record levels, predicts E. J. Thomas, president, Goodyear Tire and Rubber Co.

He estimates U. S. rubber consumption will reach 1,288,000 long tons next year, about twice prewar use and second only to 1947 when a tremendous wartime backlog existed.

About 58 pct will be synthetic rubber compared to 42 pct tree rubber. Use of synthetic rubber provides a bulwark against the historic instability of the natural rubber market, Mr. Thomas believes.

Index Cuts Wages — An early fall slump in the Bureau of Labor Statistics index will cut wages of 1 million auto workers 1¢ per hr starting Dec. 1.

The quarterly revision of the auto workers' escalator clause wage scale resulted from a drop of the index from an all-time high of 192.4 on July 15 to 191.5 on Oct. 15.

UAW officials immediately declared that the drop in the index did not represent a long term slump, but merely reflected a seasonal drop in produce prices. The significance of this complaint is that it merely adds more fuel to UAW's current demands that cost-of-living gains hold firm.

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NATIONAL STEEL CORPORATION

PRODUCTION: Ford Sharpens Weapons

Readies automated engine plant and modern foundry . . . Hopes to challenge Chevrolet output . . . Plants are in partial production but will not go all-out until controls are lifted.

Two of Ford's newest weapons in the automotive production war are being tuned up in suburban Cleveland. In adjacent plants are Ford's newest automated engine plant and its most modern foundry, each now rounding into production.

The two plants are part of Ford's vast billion-dollar expansion program aimed at challenging Chevrolet's top position in auto production. When controls are lifted and free production is again the rule, Ford hopes to have the tools ready for competition.

New Mercury — The engine plant has already turned out more than 175,000 6-cylinder engines and will start construction of the new Mercury 8-cylinder powerplant when tooling can be completed. When tooling is ready, the plant will have a capacity of 4600 engines daily.

Adjacent to the engine plant is the foundry, now turning out all castings for Ford 6's. In this foundry the traditional dusty, smoky atmosphere is absent. Instead, the air is clean and working conditions are on a par with the best.

Charles H. Patterson, general manager of Ford Engine & Foundry Div., said approximately 15 pct of the foundry construction costs went into the ventilation system. It is capable of circulating 2.8 million cu ft of fresh air a minute.

Four of the foundry's eight molding lines are in operation. At its peak, it can turn out castings for 4600 engines a day, matching the capacity of the nearby engine plant. It can handle 1400 tons of hot metal daily. The Cleveland foundry is nearly equal in capacity to Ford's Dearborn foundry which is also being modernized.

Each plant employs the newest methods of production. The engine line is as fully automated as possible.

Transfer Link — The engine block line consists of 42 automatic machines linked by transfers that perform 530 precision cutting and drilling operations on each casting before it is a finished block ready for assembly.

Machining of aluminum pistons requires 25 stations, also tied together with automation equipment. Cylinder heads, crankshafts, camshafts and flywheels are also processed with the aid of automatic handling.

Packards Aim at Two Markets

Packard last week showed its new models, separated into two distinct lines aimed at recovering class prestige while nailing down a share of the medium market.

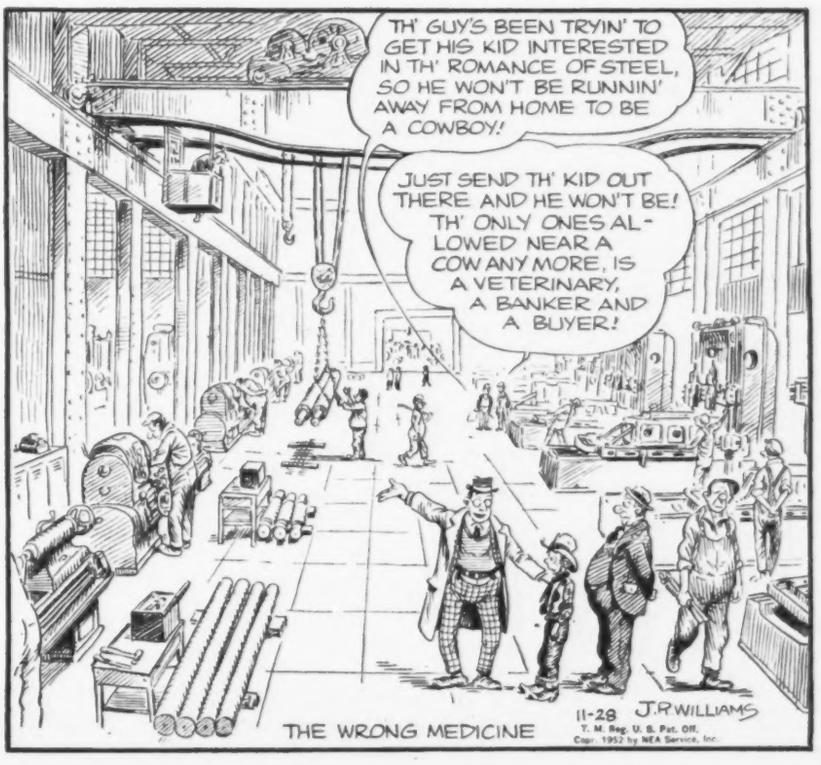
Exterior styling lines were retained but improved interiors and new engineering features were introduced on both lines. The new models confirmed president James J. Nance's promise to hold price lines.

Prices on the Clipper series will range from $2,534 to $2,795. Packards will go as high as $6,900. Custom cars will not be ready for the market until early 1953. Engine hp has been increased from 155 to 180 hp on the Packard; from 135 to 160 hp on the Clipper de luxe models; and from 135 to 150 on the Clipper models. Packard is offering its own power-steering design as well as power brakes, ultramatic transmission and air conditioning.

New President for GM

Harlow H. Curtice will take over as acting president of General Motors Dec. 1, replacing C. E. Wilson, who abdicated from the presidency to become Secretary of Defense.

THE BULL OF THE WOODS — **By J. R. Williams**



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Government Industry Yields No Taxes

But private enterprise does . . . That's why some Congressmen change minds about public power, etc. . . . Treasury needs the taxes . . . Cite Wilson sale-to-the-public plan—*By G. H. Baker.*

New support for proposals that the Federal Government divest itself of some of the business enterprises it has entered into in recent years is building up on Capitol Hill.

Biggest reason why these proposals stand a better chance of being enacted into law in 1953 than at any time during the past 20 years: U. S. Treasury's increasingly acute needs for new sources of revenue.

Even congressmen who have steadfastly maintained that government had a "duty" to move into the electric power business, the telephone business, and the reclamation business now are changing their minds. What's helping them do so is that these projects yield fat taxes only under private industry.

Liquidate Debt—Charles E. Wilson, of General Electric, former defense mobilization chief, predicts that sale of government dams, generating equipment, and distributing facilities alone would permit liquidation of 10 pct of the national debt. Under this plan, government bonds would be exchanged for shares of stock in the new companies which would arise from the existing government agencies.

About $1 billion a year in new taxes could thus be derived from the new business firms, Wilson estimates.

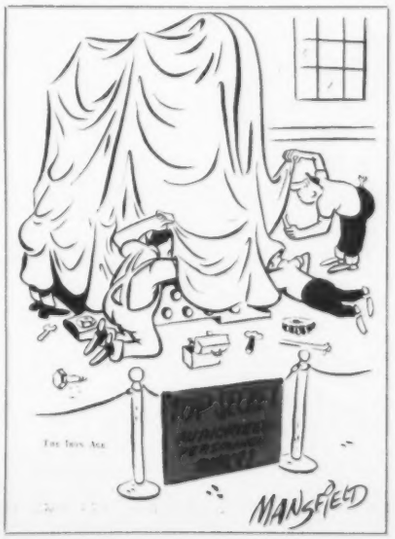
Unclear Motive? — Question some Washingtonians are asking is what President-elect Eisenhower will do next January to alter the tone of the Federal Trade Commission's "commercial survey" of the steel industry — if a change is needed by then.

It has been unofficially decided by a majority of the FTC to heed President Truman's request for an investigation of every level of the steel field. This would be all-encompassing — including production, distribution, and consumption. Ostensible motive is to establish how the American consumer's dollar is spent.

But it has been strongly rumored that there is a method to this seeming innocence. This question has been asked: Will this survey be used as a means of broadening that favorite Democratic pastime of using steel as a whipping boy?

Assemble Data — Public hearings on this broad subject probably will get under way late next month or early in January. In preparation for the hearings, FTC staff members have begun to assemble existing data on how the U. S. sales dollar is spent—how much for materials, how much for labor, how much for overhead, etc.

In addition to the steel industry, the commission also plans to conduct similar public investigations of some consumer durable goods and food industries.



A-Bomb Architecture—A change in architectural design of industrial and commercial buildings may be desirable in the near future. New types of buildings most suitable to today's unsettled international conditions may be windowless to a large extent. These will not quite match those pictured in science-fiction but they will be built in such a way as to lean or bend under the impact of an atomic blast.

A certain amount of "give" is needed to prevent breaking up.

Reasons are plain. Dispersal has never been more than a partial solution to the defense problem of more devastating atomic attack.

Greater Range—This is pointed up by Atomic Energy Commission's cautious statements and eyewitness reports on the latest atomic blast. Whether it was an A-bomb or an H-bomb, it's now clear that distances of from 5 to 10 miles from the point of explosion are no longer safe except with protective measures.

What then is the next step? A change in architecture and industrial building design, say engineers and architects after long study. They have already come up with new design methods which have been tried and have survived.

Don't Wait—A basic principle calls for as few windows as possible, particularly on the lower floors. Other methods are technical in nature, being based upon usable theories of the Army's Corps of Engineers.

Officials would like to see changes start immediately. The reason is that the building rate is now about $30 billion annually. About one-half this amount goes into structures in which the nation's labor force spends its working hours.

ALUMINUM: Name Fifth Producer

Olin Industries, Inc., signs up for 110,000-ton share of third round . . . Certificates granted . . . Government may not stop at 200,000-ton goal in this round—By *A. K. Rannells.*

Potential production figures for primary aluminum rose to a new high of 1,637,000 tons last week as a fifth firm prepared to enter the industry with the blessing of the government.

Olin Industries, Inc., of East Alton, Ill., is to be the fifth and newest aluminum producer. The firm had been mentioned prominently during negotiations for a third round of capacity increase.

Defense Production Administration last week said that two certificates of necessity, covering $170 million worth of construction, had been issued to Olin.

Raw and Finished — One certificate was for $123 million for construction of facilities for producing an additional 110,000 tons of primary aluminum. The government will allow fast tax write-off for 85 pct.

A second certificate was issued for $46 million worth of facilities for production of sheet, plate, and extrusions. It allowed only 50 pct coverage for tax amortization purposes.

From these facilities are expected to flow about 40,000 tons of wide, high strength aluminum sheet and an estimated 12,000 to 15,000 tons of extrusions.

No other government aid except probable materials priorities is to be given the new entrant to the field, DPA says. Facilities are to be built entirely with private financing at a location yet to be decided.

On Oct. 1, the DPA had revealed that after months of indecision it had finally decided another round of aluminum expansion was needed.

This new target called for 200,000 tons in new capacity. It was to be reserved for new entrants to the field. And a little later, DPA said it had received six or eight "firm and sound" proposals.

May Exceed Goal—The new certificates give Olin the major portion of the proposed new capacity. However, it was not expected that DPA would hew strictly to the line in its new goal but might approve facilities somewhat in excess of the remaining 90,000 tons.

In fact, there is talk of a fourth round of aluminum expansion. This may range from 200,000 to 400,000 tons.

With Olin's entrance into aluminum basic capacity increases to a potential 1,637,000 tons. This includes capacity in place, under construction, or planned.

About 430,000 tons is now under construction, or projected.

The Line—Existing and projected capacity is roughly divided up as follows:

Aluminum Co. of America, eight plants, 654,000 tons; Reynolds Metals Co., six plants 415,000 tons; Kaiser Aluminum & Chemical Corp., three plants, 408,000 tons; Olin Industries, Inc., 110,000 tons; and Anaconda Aluminum Co., one plant, 50,000 tons.

Expansion by the "big three" is nearing the final stages while the Anaconda program is scheduled for completion next year. No estimated date had been set last week for Olin.

Atomic-Powered Carrier Planned

Likelihood grows that the first atomic-powered aircraft carrier will be built at Newport News, Va., where the super-carrier *Forrestal* is under construction.

The *Forrestal* itself and a sister ship being built at the New York Naval Shipyard will have conventional engines. However, Newport News Shipbuilding & Drydock Co. has recently been named as subcontractor to Westinghouse Electric Corp. in handling a project for development of an atomic engine "for a major warship such as an aircraft carrier."

New Cabinet Appointments

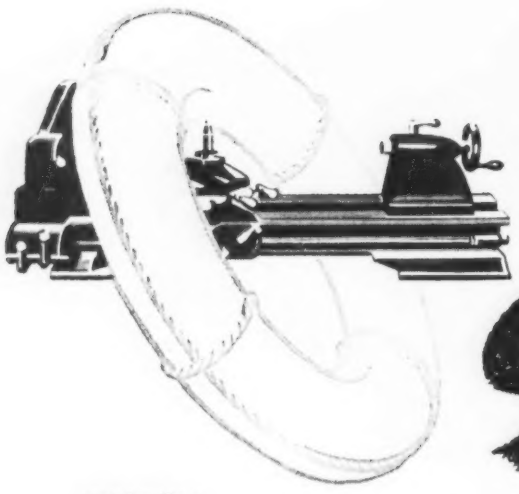
Secretary of State — John Foster Dulles, 64, experienced government advisor on international affairs. Engineered the Japanese Peace Treaty. Held his first diplomatic post in 1917.

Secretary of Defense—Charles E. Wilson, 62, president of General Motors since 1941. Earned $566,200 last year to rank as the nation's top paid business executive. He is opposed to the closed shop but originated the escalator wage plan.

Secretary of Interior—Douglas McKay, 59, former Senator and present Governor of Oregon. Favors development of natural resources but is opposed to present administration's method.

Secretary of Treasury—George M. Humphrey, 62, is present chairman of M. A. Hanna Co., Great Lakes ore shipping concern. He is also an official of four other major companies. In 1948 and 1949 he served as chairman of the Industry Advisory Committee of the Economic Cooperation Administration.

Attorney General — Herbert Brownell, Jr., Nebraska-born lawyer and New York political leader. Received law degree at Yale, practiced profession in New York, specializing in civil rather than criminal phases. Member of State Assembly from 1933 to 1937. Has been key advisor to Gov. Dewey since 1942. First action after being named to cabinet post was to request that J. Edgar Hoover be retained as FBI head.



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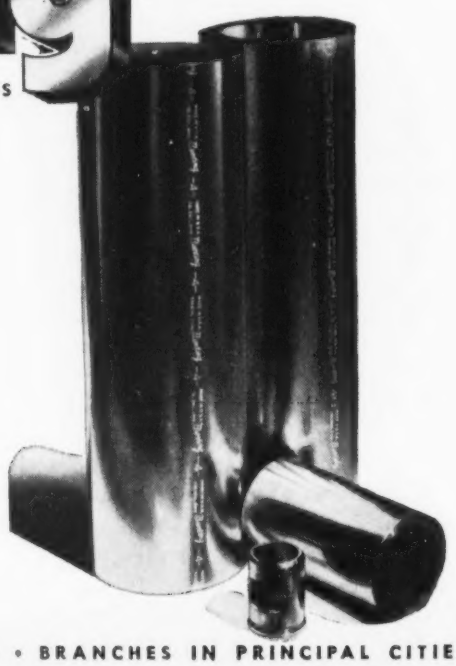

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Coast Shipbuilding Stages Comeback

Bethlehem Pacific lays keel for first of five Maritime Commission freighters . . . First seagoing ships to be begun in West Coast yards in 8 years—By *T. M. Rohan.*

Shipbuilding in the West came back to life last week. Bethlehem Pacific at San Francisco laid the keel for the first of five Maritime Commission cargo ships—the first oceangoing vessels to be started in the West in 8 years. Long delayed by the steel strike, reshuffling schedules and priority snarls, the 30-ton assembly of 1-in. plate was swung into place with brief ceremonies.

The $9.5-million, 12,900-ton *Golden Mariner* will be the first of five Maritime Commission transports to be built in a $47 million program at Bethlehem Pacific. Thirty others will be built in eastern yards.

Shipyard Manager T. C. Ingersoll said the *Golden Mariner*, already well under way in subassemblies, will be completed in a year. Heavy plates, which must be brought from the East, are now coming through fast enough for orderly production and "we'll probably be getting all we need by the second quarter." Shipbuilding employment is now about 400 and will hit 2500 by December, 1953, with a 3500 peak later on.

New Aluminum Plant—Harvey Machine Co. of Los Angeles got its foot a little farther in the door of the aluminum production picture last week. Through a Defense Production Administration application, news got out and was confirmed by L. A. Harvey, vice-president, that the firm hopes to build a $45 million aluminum reduction plant near Dalles, Ore., 80 miles east of Portland on the Columbia River. Annual capacity would be 54,000 tons and construction would start immediately on granting of a certificate.

Harvey already has a piece of the 72,000-ton Anaconda-Harvey plant at Kalispell, Mont., scheduled to start in 1953. The current Harvey bid is the only western one of four others hoping to get in on the 200,000 tons added U. S. capacity that D.P.A. wants.

Harvey reports private financing has been arranged. In view of the government program a fast tax write-off is probable. Options have reportedly been taken for 80,000 kw from Bonneville Power Administration and two local utility districts plus 60,000 kw interruptible from Bonneville. Power would come from the new McNary dam, 100 miles up the Columbia River.

Local Opposition—Some opposition has already been registered from power-starved local industrial leaders who last week got ready for another cut.

Defense Electric Power Administration queried industries in Seattle and Portland on how additional 10 pct cuts in December, January and February would affect them. Most agreed it would mean a 3 or 4-day week. Many have already stopped all overtime and Saturday work and layoffs by aluminum producers are widespread. Chances for defense work exemption appear slim because of the preponderance of these in the area.

"No Gas, No Water"—North of the border the British Columbia land minister came up with a power play. Robert Sommers said if the U. S. wants water rights to build a dam at Libby, Mont., for more power, Seattle interests must stop opposition to importation of Peace River, Alta., natural gas.

The proposed dam would back up the Kootenay River into Canada and a water rights controversy has ensued. Mr. Sommers said British Columbia "holds the trump card in this international poker game and if the Americans don't take the gas they don't get the water."

Some Predictions—Western steel warehousemen got some food for thought last week from H. G. Batcheller, Allegheny-Ludlum's board chairman who made a western swing with E. J. Hanley, president; Clark King, vice-president, and Walter S. Doxsey, American Steel Warehouse president.

Some Batcheller observations and predictions in San Francisco:

The U. S. will need 150 million ingot tons output in 20 years.

Depletion of high grade Mesabi ores doesn't present an insurmountable crisis but a challenge which is developing new ways of utilizing lower grade ores and forcing more efficient use of other mineral resources.

New era of physical metallurgists will not end steel age but improve alloys and utilize metals such as germanium, gallium, and titanium.

Gage Supply Indicator Hits Low

Capacity not sufficient to match machine tool needs . . . New weapons and skilled labor shortage increase pressure . . . Capacity expansion goals examined—*By E. C. Beaudet.*

To put a metalworking defense plant into production three fundamental items are needed: Machine tools, cutting tools and gages. The three go hand in hand. Without one the others are of little value.

With machine tool shipments steadily rising and cutting tool requirements being filled, it suddenly appears there may not be enough gages to go around. Ways of meeting the growing gage demand is one of the major concerns of government and industry right now.

Facts and figures are being assembled by National Production Authority's Metalworking Div. in preparation for recommendations to Defense Production Administration on the amount of gage capacity needed to meet defense requirements. Recommendations on additional capacity will be submitted to the top brass shortly.

How Much?—Two key officials concerned with the matter say a minimum of $25 million worth of new capacity is needed. But some claim the gage industry is far too small for a big defense program and think twice as much capacity is required for reasonable safety.

There is no shortage of standard gages at present. However, "selective" or special types are in extremely short supply. Deliveries on these specialized items are running from 60 days to 6 months or more behind requested delivery dates.

The Reasons—Reason for this holdup is two-fold. First, it is largely a shortage of special gage capacity for military applications. Constant changes in specifications as new weapons are developed add strength to demand. New weapons force use of more gages of finer precision so that faster production can be obtained.

Second factor entering into the problem is manpower shortages. Additional skilled labor at present would have to come from the tool and die industry. In an emergency, this is a "rob Peter and pay Paul" policy.

Intensive Study—The expected recommendations for greater capacity are being made only after a long and extensive survey of the industry. This has included studies of both industry and government arsenals. Comments and recommendations as to how the expansion should be achieved have been sought from both.

It is expected that the recommendations will call for greater governmental participation than in most other expansion programs. Reason for this is that a substantial portion of new capacity will be for production of the special types of gages needed to boost military output. They will have little or no application to nonmilitary production.

"That's Albert, our expediter."

Labor Supply—In addition, it is believed the recommendations will suggest that new capacity be developed in areas where gages are not being produced at present. This would include such areas as New England, rather than Detroit and the Midwest, because it would be easier to obtain and train workers.

New Plan—Construction of a $5 million plant for production of heavy special machine tools weighing as much as 250 tons was begun recently by Kearney & Trecker Corp., Milwaukee. More than $25 million worth of machine tools will go into the 173,000 sq ft of manufacturing space in the new plant. Completion is expected around mid-1953.

Primary purpose of the plant is to meet the needs of the Air Force's $400 million heavy press programs. Growing out of the aircraft press program is need for new tool capacity to machine die blocks used in the presses and the forgings made on them. Some of these die blocks weigh over 10 tons. Forgings are as long as 20 ft.

Civilians, Too—Francis J. Trecker, president of the company, pointed out that although Defense Dept. would have first call on the new plant's capacity, a great part of it will be available for civilian producion. This is due to the fact that the government is now interested in additional defense capacity to be called upon in an emergency rather than in immediate production.

The plant will have crane facilities to handle machine parts weighing up to 50 tons. When in production it is expected to employ about 400 workers, 80 pct of whom will be skilled machinists and assemblers. Many of these will be transferred from the company's West Allis, Wis., plant.

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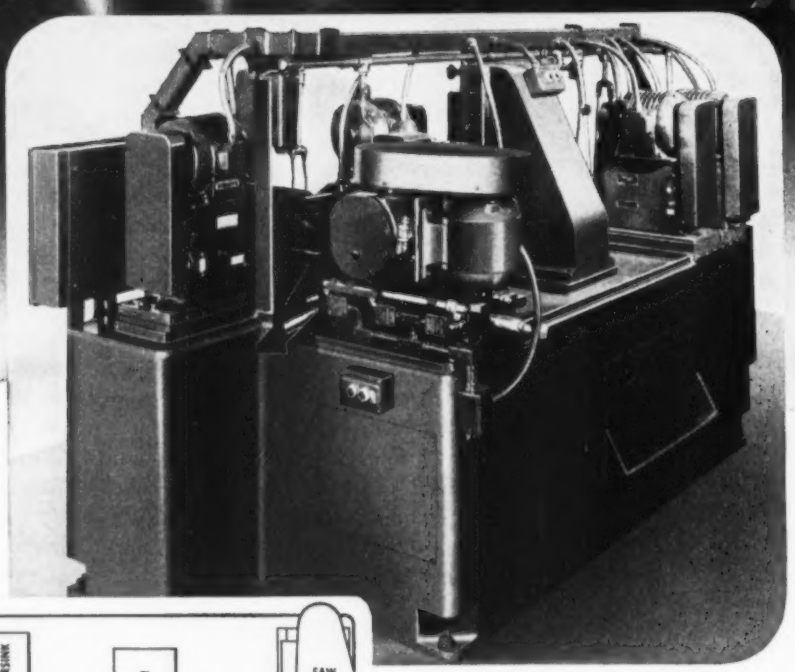

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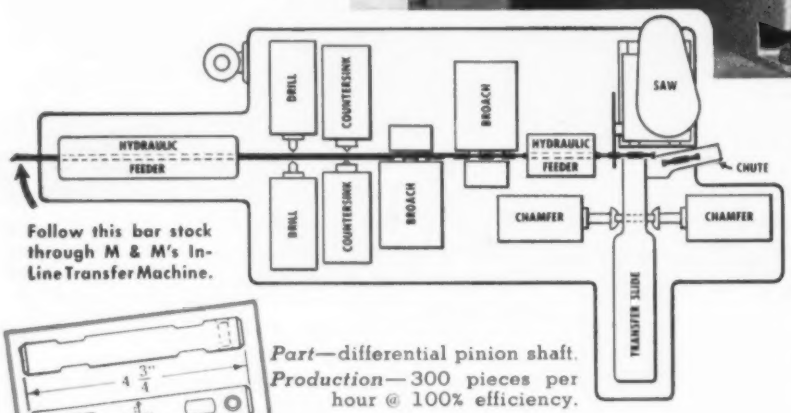

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U. S. Looks North for Nickel

To meet new nickel goal of 190,000 tons in 1955, U. S. will have to rely on Canada . . . May have to share in expansion expenses . . . New mines a must—*By F. Sanderson.*

A new nickel supply goal of 190,000 short tons annually, set by the U. S. Defense Production Administration for 1955, has swung more interest to nickel deposits in Canada. The U. S. goal represents an increase of 58,000 tons over the 1954 mark set earlier this year and is 89,000 tons more than the 1950 supply of 101,000 tons.

The U. S. is a small nickel producer and must depend on outside sources for the big jump in its supply goal. Last year the U. S. produced only 762 tons of new nickel and obtained 88,000 tons from Canada.

Main Source—While the U. S. will obtain nickel from other countries outside Canada, it can be taken for granted that U. S. purchasing agencies are depending more on this country than any other to fill its 1955 target.

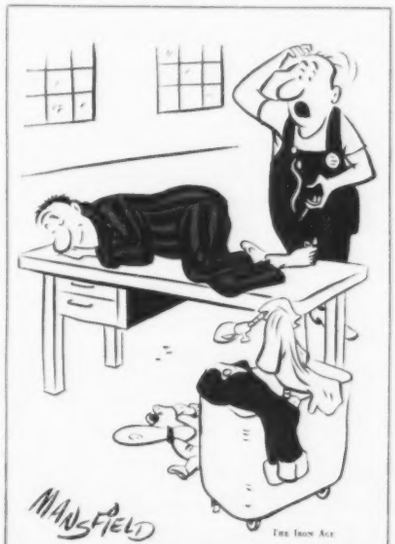
The Canadian mining industry is aware of the part it must play in providing America's record nickel supply. It is acting accordingly.

While Sudbury, the home of the world's greatest nickel producers, is rapidly expanding, the search for new deposits is extending across the Dominion. Known deposits that produced in a limited way many years ago or received only slight exploratory attention are being gone over carefully as new-producer prospects.

Meet the Tab—If the U. S. wants Canada to be the prime supplier in the new nickel program, it may be required to foot the much larger bills entailed in developing new properties here.

U.S. has already made some important financial deals with Canadian companies for increased nickel supply—with Sherritt-Gordon, Falconbridge Nickel, East Rim Nickel, Milnet Mines. Others are said to be pending. They will boost annual supply available to the U. S. by some 15,000 tons. Production from these companies should have a stimulating effect on U. S. supplies next year. But to meet the full requirements Canada will have to go much farther along the road of discovering new deposits. Increased production so far arranged represents only about 15 pct of the additional U. S. supply suggested for 1955.

International Nickel Co. of Canada has been proceeding with an extensive program of mine development to enable it to maintain production at its current level. So far the company hasn't announced plans to substantially increase output. Falconbridge Nickel is stepping up production but the majority of other producers seem to have about reached the limit.



"You really take rest period seriously, don't you?"

It appears that any big supply increase must come from new mines. Consideration must also be given to the problem of establishing plants for ore concentrating and metal refining.

Output Boosted—Barvue Mines Ltd., which has a contract with a U. S. Steel Corp. subsidiary to supply 175,000 tons of zinc concentrate, is gradually stepping up production. Last week the company put its second unit into operation and is now handling 2400 tons of ore daily. A third unit is expected to start this week which will permit an increase to 4000 tons daily.

Fourth and final unit will go in as soon as sufficient power is made available, possibly early next year. With all four units operating, the mill will handle upwards of 6000 tons a day. Concentrates now being turned out average between 59 and 60 pct zinc. Already nine carloads have been shipped.

Construction—Iron Ore Co. of Canada Ltd. is making good progress on various construction operations associated with its big iron ore production program in the Quebec-Labrador area. The company can begin its 10 million tons a year production and shipping set-up in 1954, but to reach the larger objective of 20 million tons annually, the St. Lawrence Seaway will be necessary to provide shipping facilities.

More than half the grading for the 360-mile railway has been completed and the first 80 miles of steel has been laid. At Seven Islands on the north shore of the St. Lawrence River, three-quarters of the giant ore docks have been completed.

When the mine actually goes into production a train carrying 10,000 tons of ore will arrive at the Seven Islands port every three hours for 6 months each year.

F&Y CONTINUOUS STRIP PICKLING LINE

NEW · EFFICIENT · ECONOMICAL

Complete line equipment with latest improved operating features. Maximum volume production with minimum floor space requirements.

If you are interested in a new installation or improving your present equipment why not investigate the Youngstown Line!

these features

- ☐ Coil Box with Strip Opener.
- ☐ Triple Processor with Roller Leveller.
- ☐ Flash Welding and Mechanical Stitching.
- ☐ Single Cycle Up-Cut Shears.
- ☐ Heavy Duty Rubber Covered, Brick Lined Steel Tanks.
- ☐ Magnetic Loop Control for Acid Tanks.
- ☐ Fume Exhaust System—Roto Clone Scrubber.
- ☐ Automatic Control System for Temperature and Acid Proportioning.
- ☐ Side Trimmer with Scrap Cutting or Balling.
- ☐ Up-Coiler with Strip Oiling System.
- ☐ Entry and Exit Coil Conveyors.

The Youngstown Foundry & Machine Co. F&Y

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

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FREE PUBLICATIONS

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Lubricating oil

High temperatures encountered in industrial operations emphasize the need for a lubricant that is heat resistant. Dag Colloidal Graphite meets this requirement effectively. It is inert and clings stubbornly to sliding or rubbing friction surfaces and retains its lubricating properties even under high pressures. In addition, Dag is economical to use. More information is available in a new folder. *Acheson Colloids Co.*

For free copy circle No. 1 on postcard.

Lathes

Lodge & Shipley's 30-in. T-Matic Lathes, covered in a new bulletin, have been designed for fast, precise automatic duplication of short, thin-walled section work of large diam. The lathes come in three models, Type X for contour facing, Type Y for contour facing and straight rough and finish turning, and Type Z for contour facing and straight rough and finish boring. Fully automatic, the T-Matics are hydraulic-tracer-controlled and have infinitely variable speed drive. *Lodge & Shipley Co.*

For free copy circle No. 2 on postcard.

Furnaces

Marshall tubular furnaces have been specially designed for the research engineers working on stress-rupture, creep and tensile tests. These furnaces provide uniform temperature distribution over the gage length of the specimen. Close-limit temperature control can be maintained in short or prolonged tests. More information on the furnaces is contained in a new folder. *Marshall Products Co.*

For free copy circle No. 3 on postcard.

Signals chart

Macwhyte Co. has made available a handy wall chart which lists crane signals and suggestions for proper use of slings. On the reverse side of the chart are tables listing strengths and safe loads for Atlas 8-Part Braided Slings and Monarch Single-Part Slings. Sling strengths range from 2/5 tons to 243.4 tons. *Macwhyte Co.*

For free copy circle No. 4 on postcard.

Castings

The Rolle method of casting magnesium and aluminum is outlined in an interesting new bulletin. Source materials, production and control techniques, and product analysis are all covered in the publication. In addition there is a section on the company's fiberglass laminated plastics. *Rolle Mfg. Co., Inc.*

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Wheelbarrows

Outlined in a new specification sheet is a wide variety of wheelbarrows designed to meet many different needs. Among the units described are heavy duty contractors' barrows, large capacity concrete barrows and medium capacity contractors' barrows. *Kilbourne & Jacobs Mfg. Co.*

For free copy circle No. 6 on postcard.

Pumps

A complete line of English pumps and related equipment is described in a new booklet issued by Pulsometer Engineering Co., Ltd., which is planning to open an office in New York. Covered are an extensive group of centrifugal pumps, rotary, reciprocating and vacuum pumps, refrigeration units and other equipment. *Pulsometer Engineering Co., Ltd.*

For free copy circle No. 7 on postcard.

Regulators

A revised 22-p. application booklet on Rototrol rotating regulators for the steel industry is available from Westinghouse Electric Corp. This edition presents up-to-date information on Rototrol's functions, applications and accomplishments as a control unit for steel producing and processing equipment. Fourteen different applications for steel mills are described. *Westinghouse Electric Corp.*

For free copy circle No. 8 on postcard.

Drills

Carlton radial drills feature centralized controls, low-hung drive and power-operated mechanical clamping of arm, head and column. Detailed in a new bulletin, complete specifications of the company's five drill models are given. *Carlton Machine Tool Co.*

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BUSINESS REPLY CARD
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THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

Burner assemblies

For the most satisfactory results on furnaces requiring a constant condition of furnace atmosphere and high combustion efficiency, tunnel burners with sealed-in nozzles are particularly satisfactory. Hauck tunnel burners are completely assembled units consisting of a sealed-in gas burner nozzle, a flanged burner mounting box and a refractory tunnel block. The company's burner assemblies and gas burner nozzles are comprehensively covered in a new leaflet. *Hauck Mfg. Co.*

For free copy circle No. 10 on postcard.

Pins, springs, bolts

Producto dowel pins, die springs, stripper bolts and cap screws are conveniently listed in an 8-p. catalog recently published by Producto Machine Co. Each product is illustrated and described in detail with technical drawings, specifications and easy to read price tables. *Producto Machine Co.*

For free copy circle No. 11 on postcard.

Handling equipment

Proper handling of parts in metalworking plants is a vital factor in speeding operations, stepping up quality and reducing costs. A new catalog describing Rolock fabricated alloy handling equipment has just been released. Of particular interest to manufacturers of steel shell cases are the new-type workholder baskets which serve through automatic cycles of many operations, *Rolock, Inc.*

For free copy circle No. 12 on postcard.

Coil holders

Acme Steel Co.'s coil holders improve wire stitch operations because wire feed is uniform and smooth. Wire is prevented from overrunning due to the coil holder's positive brake action. As wire begins to feed the long spring arm moves with the wire instead of against it. The coil holders are available in 25 and 50-lb models. More information is contained in a new folder. *Acme Steel Co.*

For free copy circle No. 13 on postcard.

Turn Page

it doesn't look like a turret lathe, BUT...

- It sets up *fast*—like a turret lathe.
- It uses turret lathe tools.
- It machines turret lathe lots, on an automatic basis, without the usual penalties of automatic operation.
- It will combine certain operations not possible in accepted turret lathe practice, thus reducing machining time.
- It will automatically change speeds and feeds under cut to assure more efficient performance of your cutting tools.
- It requires less skill to operate—and one man can handle two or more machines.

. . . it is the Warner & Swasey 1-AC Single Spindle Automatic Chucking Machine.

With today's emphasis on greater production, there are undoubtedly certain jobs in your shop that could be machined faster and better on the 1-AC. Call in your nearest Warner & Swasey Field Engineer—he'll show you exactly how it can improve your operation.

WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

—Free Publications—

Continued

Millers

Designed primarily for quantity production of small intricate parts, Multi-Millers have also proved profitable in the milling of such parts in small lots. The automatic table cycle of fast approach, cut at desired speed and fast return to loading position enables a single operator to handle a battery of machines. *U. S. Tool Co., Inc.*

For free copy circle No. 14 on postcard, p. 69.

Presses

Information on Lake Erie Engineering Corp.'s complete line of hydraulic bulldozers is contained in a new leaflet. These heavy-duty presses simplify numerous hot and cold bending and forming operations, cut die costs, save time on setups and are ideal for work on long pieces. *Lake Erie Engineering Corp.*

For free copy circle No. 15 on postcard, p. 69.

Metal washing

A new illustrated bulletin on metal washing equipment has just been prepared by Despatch Oven Co. The bulletin illustrates and describes typical Despatch washers from single stage units for simple wash jobs to multiple stage machines used to prepare metal for fine finishes. *Despatch Oven Co.*

For free copy circle No. 16 on postcard, p. 69.

Dehydrators

Water vapor in moisture - laden gases affects product quality and causes operational difficulties due to condensation. Selas dehydrators are designed to remove this moisture to protect products from corrosion and freeze-ups. More information is available in a new booklet. *Selas Corp. of America.*

For free copy circle No. 17 on postcard, p. 69.

Metalworking saws

A combined slitting and grooving saw, the North American Woodsman, designed for the metalworking industry, is outlined in a new mailing piece. Carbide-tipped, the saw is reported to hold its size, cut faster, give longer service and finer finish. *North American Products Co.*

For free copy circle No. 18 on postcard, p. 69.

MAGNAFLUX

THE PIONEER IN NON DESTRUCTIVE TESTING

Now Announces Spotcheck

a simple SPRAY-ON DYE PENETRANT inspection

END GUESSWORK ARGUMENTS!

Use it to Locate and Mark Defects Open to the Surface in Metals—Carbides—Plastics —Ceramics—Practically any Non-Porous Solid

Spotcheck crack indication revealed in inspection of local area of punch press frame.

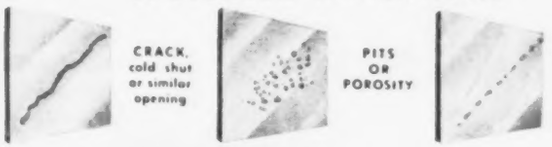
How Spotcheck shows up non-visible crack in carbide tool. Correct grinding! Avoid failure after set-up!

Spotcheck is a new, *lowest cost* inspection tool for use where remote location, small surface areas, limited volume or the cost of disassembling equipment makes use of fixed inspection equipment impractical. The complete kit is as easy to carry as a dinner pail!

A new member of the world's best known Magnaflux family of inspection methods, Spotcheck finds and indicates cracks, porosity, laps, seams, etc., clearly and unmistakably. It takes the guesswork out of countless sampling inspection jobs.

Used for *maintenance inspection,* local and routine Spotcheck tests will help you to prevent costly on-the-job failure of production machines. SPOTCHECK IS IDEAL FOR INSPECTION OF CARBIDE TOOLS AND OTHER TOOL CRIB USE!

SPOTCHECK INDICATIONS



Complete Spotcheck Kit No. SK-1
8 12-oz. cans; 4 of Cleaner, 2 each of Penetrant and Developer, together with carrying case, plus instructions and accessories.

LOW IN FIRST COST

$35.00

plus $1.00 packing and shipping

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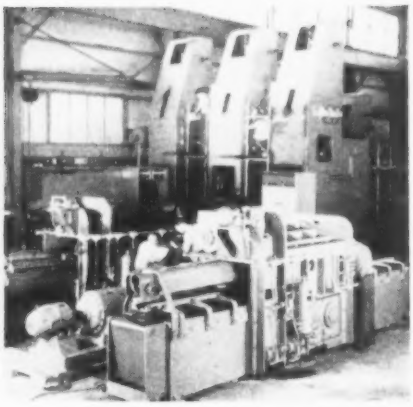
NEW EQUIPMENT

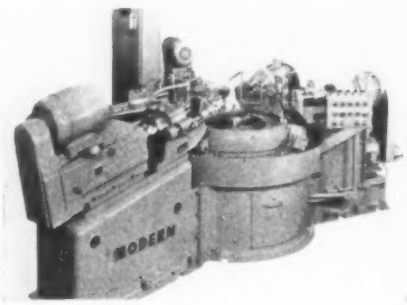
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 69 or 70.



Horizontal broach has high operating speeds

A new mechanically-driven horizontal broaching machine features an operating speed of 150 fpm or more, to remove a large amount of material in the shortest possible time. It is rugged, heavy, and rigid and can be equipped with drives up to 200 hp for powerful, high-speed broaching. Offered with strokes ranging from 66 to 200 in., the machine is built around a special electric drive to give it great flexibility. On its reciprocating table, there can be mounted whatever type indexing may be required to suit any size or shape of disks and wheels now being made for jet engines. Suitable hydraulic units are built within the base of the machine, but actual operation of the main work slide is done mechanically. The machine has dual speed. *Lapointe Machine Tool Co.*

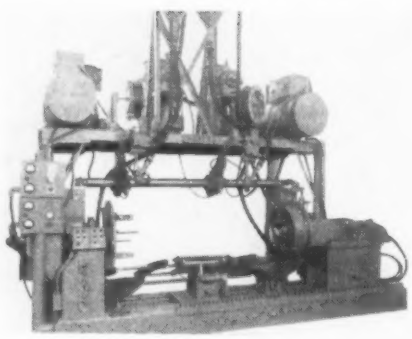
For more data circle No. 19 on postcard, p. 69.



New drilling machine for jet engine housings

Five-way drilling machine for jet engine housings features interchangeable multiple drill heads on two of the five stations. This enables the production of several types of housings having a variety of bolt circle specifications on faces with identical radial locations. Loading, clamping and indexing of the housings in the fixture is done manually and indexing between operations is manual. The table can be indexed in a clockwise direction only. Eight stations and 9 operations complete the drilling and tapping of holes. *Modern Industrial Engineering Co.*

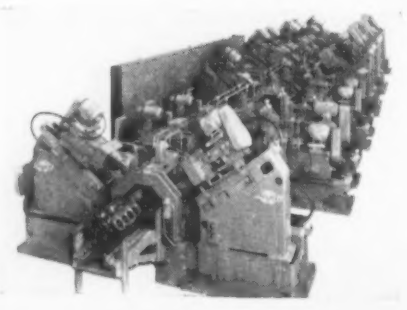
For more data circle No. 20 on postcard, p. 69.



Girth welding machine for tank production

A press and girth welder is engineered to make fillet and burn-through circumferential welds. It features a built-in 5-ton hydraulic press for the assembly of parts prior to welding. A two-pressure hydraulic system is incorporated with high pressure for assembly and low for holding parts during welding. The press is under push-button control and the eject and reload cycle is automatic in operation. Manual longitudinal and radial positioning of the welding heads is provided to cover the machine range. Capacity is 9 to 24, 12 to 36 or 18 to 48 in. diam, to 96 in. long. *Morton Mfg. Co.*

For more data circle No. 21 on postcard, p. 69.



Transfer unit machines 75 cylinder blocks per hour

An 18-station automatic transfer machine performs 110 machining operations in 38.3 sec. Drilling, reaming, boring, counterboring, and core-drilling operations are performed in machining the banks, sides, and starter-mounting pad of the blocks. Cylinder blocks are received with pan-rail up. A turnover fixture at the first station raises, rotates and deposits the block pan rail down in which position it remains during machining operations. *Greenlee Bros. & Co.*

For more data circle No. 22 on postcard, p. 69

Turn Page

"Bill, making or losing money today

can depend on

The Turn of a Screw!"

"Stop pulling my leg," Bill retorted skeptically.

"I'm not exaggerating. You can't afford to take your fasteners for granted," Bob insisted. *"I'm saving time—and time is money—just by following the RB&W man's suggestion to use another kind of screw in my TV sets."*

"What kind?" asked Bill.

"RB&W's new SPIN-LOCK Screw," answered Bob. *"It has a patented feature—ratchet-like teeth under the head—that not only locks into the surface and holds tighter, but also speeds assembly. It does away with extra parts and special handling. Bet your switches could use 'em, Bill."*

MORAL: Look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New fasteners may prove more efficient than the ones you're now using. Or you may save by the stepped-up production you get from using the finest fasteners . . . RB&W bolts, nuts, rivets and screws of uniform accuracy, dependability and physical properties.

Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W at Port Chester.

RB&W—The Complete Quality Line. Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, San Francisco. Sales agents at: Portland, Seattle. Distributors from coast to coast.

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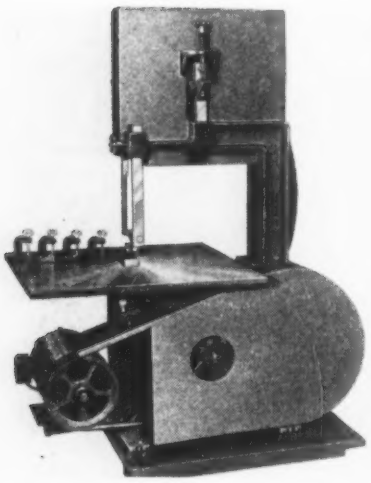
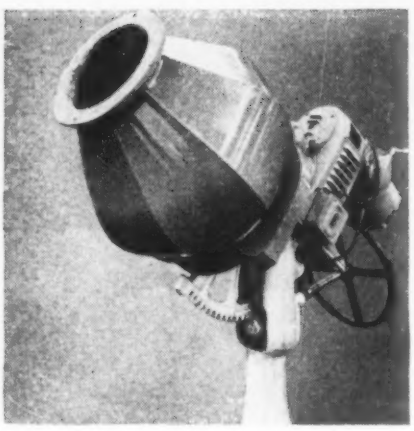


Versatile saw cuts stacked sheet metal

Fifty to 70 stacked galvanized sheet metal sheets can be cut at the rate of 15 ipm with an improved, heavier model sheet metal saw having all cast frame. It is an all purpose 14-in. ball bearing band saw, with blade speeds from 125 to 2200 fpm, quickly adjustable for cutting metals, plastics, wood, iron and steel castings and forgings, and other materials, without blade chatter. Intricate cutting jobs encountered in ductwork fittings can be done on this saw in a fraction of the time necessary for hand-cutting. The 20 x 22 in. table permits handling of large work. Case hardened guides with carbide back-up bearing assure positive blade control and cutting accuracy. Flanged wheels control blade for smooth radius cuts and perfect straight line cuts. Complete equipment includes a set of 4 sheet metal clamps and riser bar insert to match for cutting stacked sheet metal. *Bett-Marr Mfg. Co.*

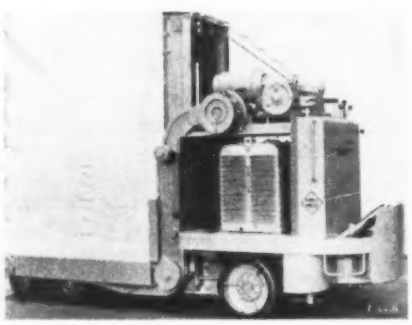
For more data circle No. 23 on postcard, p. 69.



Tumbling barrel boosts production

A flask-type, direct motor drive, tilting tumbling barrel is said to give better work action for deburring and burnishing precision parts both ferrous and nonferrous. The machine may use all types of deburring and burnishing media; is available for loads ranging to 750 lb. The flask-type barrel is constructed of continuous welded sections of heavy steel plate. A ¼-in. lining of abrasion resistant rubber or neoprene vulcanized to the barrel provides effective insulation to give longer life to the barrel shell while protecting parts against nicking and scratching. Direct drive is provided with a 1 hp motor mounted directly above the worm segment for balance and space economy. A heavy cast iron base and special high-strength alloy pedestal supports capacity loads in continuous service. Barrel speeds can be as low as 17 rpm. *Hupp Corp.*

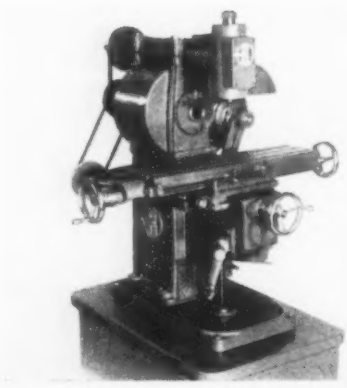
For more data circle No. 24 on postcard, p. 69.



Die puller has 30,000 lb capacity

Improved operator vision and better maneuverability characterize this die pulling truck. This line of equipment, available in 10,000 to 50,000 lb, is intended for handling stamping and forging dies on and off press beds; they are frequently used as load carriers and for machinery moving. A power operated cable winch located on the uprights pulls heavy loads on the load platform. When looped over sheaves at the end of the platform it will push load off the platform. Motive power is supplied by either a storage battery or gas-electric unit. *Elwell-Parker Co.*

For more data circle No. 25 on postcard, p. 69.



Compact bench mill accomplishes heavy work

Heavy work ordinarily requiring larger, expensive mills can be done on a new, compact bench mill of sturdy design and great rigidity. Work requiring a 12-in. in length, 9-in. vertical and 5-in. cross travel is possible on the 5 x 20 in. table surface. The large diameter spindle supplied with a No. 10 B&S or No. 4 Morse taper and operating at 15 separate forward or backward speeds is equipped with large Timken bearings. All ways are dovetail type and are hand scraped; table and knees are exceptionally wide. Milling of table T slots from solid insures inflexible anchoring of work itself. Work is power fed at 0.003, 0.006 or 0.012 per spindle revolution. *Rotex Punch Co.*

For more data circle No. 26 on postcard, p. 69.
Turn Page

—New Equipment—

Continued

Abrasive blades

To simplify cutting tough building and industrial materials such as stone, metal, plastic, and synthetic hardboards, a new set of equipment consists of a high-speed, kick-proof electric saw and three types of abrasive blades. The blades are reinforced and semi-flexible to reduce danger of breakage. The abrasive edge is said to produce a quicker, cleaner cut, and the side of the blade can be used as a grinding wheel to deburr, bevel or polish. Blades are color coded, available in 6, 7 and 8-in. diam. *Porter-Cable Machine Co.*

For more data circle No. 27 on postcard, p. 69.

Dust-free coal

Spraying coal prior to shipment with a special chemical solution known as Compound M allays dust. The preparation is nontoxic and harmless. The treatment in no way affects the burning qualities of the coal and is said to eliminate more effectively the annoyance of coal dust in shipment, handling, and storage. *Johnson-March Corp.*

For more data circle No. 28 on postcard, p. 69.

Carbide gage block

Gage blocks made of chrome carbide (Croblox) have superior corrosion resistance, plus a remarkable similarity to steel blocks in the coefficient of expansion. Croblox expanding in nearly the same degree as steel makes it easier to use. Room temperatures can be ignored. The blocks can be exposed to a wide range of atmospheric changes without a trace of rust. Surface finish of 0.1 microinch is attainable. Two, 3 and 4-in. blocks are provided with bakelite finger grips to shield blocks from body heat. *Webber Gage Co.*

For more data circle No. 29 on postcard, p. 69.

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Sharon

430

STAINLESS STEEL

SHARONSTEEL

SHARON STEEL CORPORATION
SHARON, PENNSYLVANIA

SHARON '430' STAINLESS IS IN GOOD SUPPLY AND IS AVAILABLE WITH FEW RESTRICTIONS

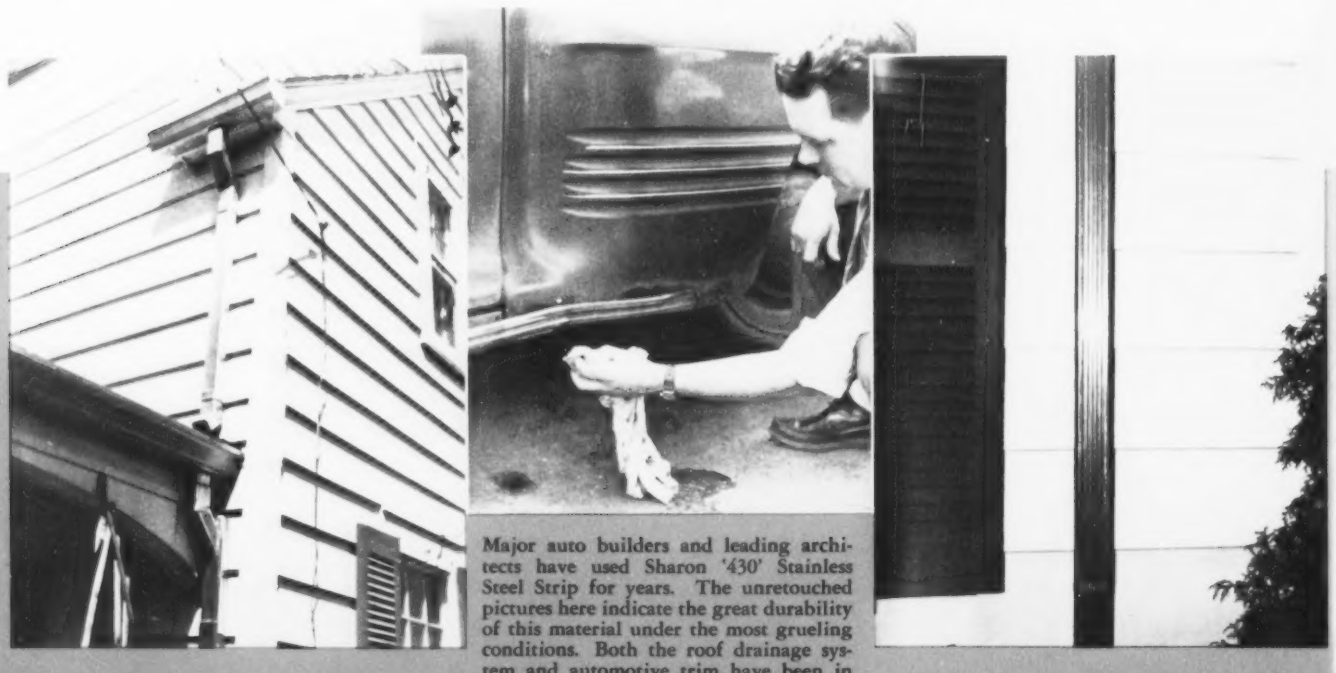
Sharon has prepared a fully illustrated booklet primarily for those who had been using one of the metals now in short supply. It is intended to introduce or reacquaint the reader with the possibilities of Type 430 Stainless Steel as a highly satisfactory primary or alternate material. The booklet contains basic fabrication information compiled to aid manufacturers in their consideration of this metal.
This booklet may contain the answers to your problems. Write for it today or contact the Sharon representative nearest you and ask him to see that you get your copy. Sharon district sales offices listed on back of next page for ready identification.

In today's economy Type 430 Stainless Steel is assuming an ever-increasing importance to producers of metal products. Government control over other metals has multiplied the difficulties of those fabricators who produce primarily for civilian consumption.

Sharon '430' Stainless is in good supply and available with few restrictions as to end use. It contains about 17 percent chromium with no nickel and has been the most popular ferritic grade of stainless steel. It comes the nearest to meeting the all-around requirements for general use. It was used before the chrome-nickel stainless steels and has a remarkable history of successful application. Absorption towers, used in the manufacture of nitric acid, made of this type in 1926 are still in service. In the automobile industry it has been especially popular. Large tonnages go into trim and window moldings where the material must meet demanding requirements, both in complex fabrication and in abusive service conditions.

Sharon '430' possesses good mechanical and physical properties and a ductility about three-fourths that of deep drawing quality carbon steel. Extra deep drawing requires more power, more clearance and more carefully selected lubricants than for ordinary steel. Intermediate annealing and pickling may be necessary.

Sharon straight chrome stainless may be

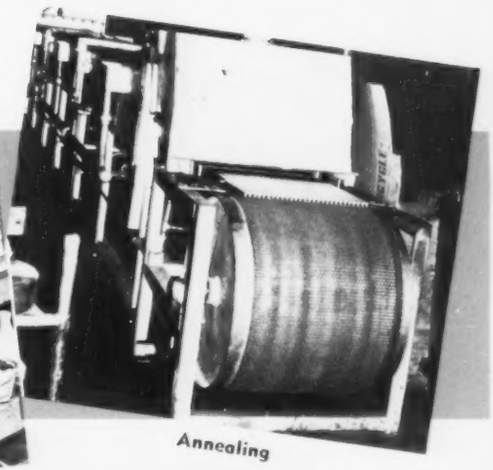


Major auto builders and leading architects have used Sharon '430' Stainless Steel Strip for years. The unretouched pictures here indicate the great durability of this material under the most grueling conditions. Both the roof drainage system and automotive trim have been in constant service for more than 10 years.

Drawing

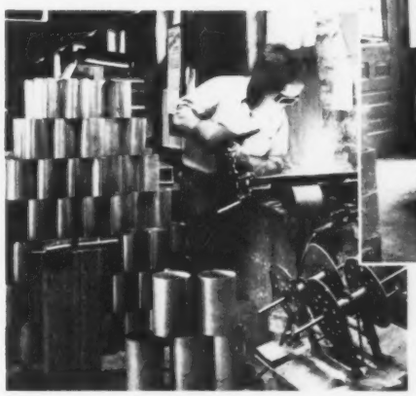
Polishing

Spinning

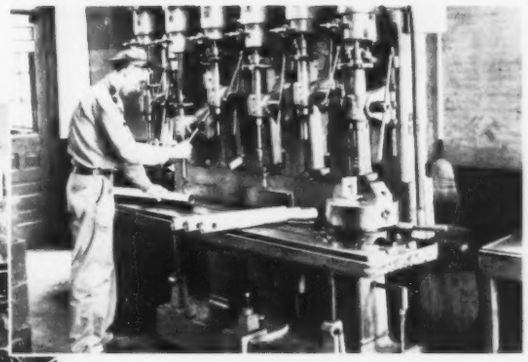


Annealing

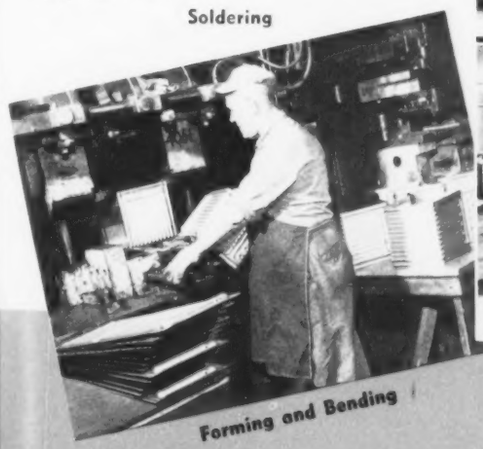
Soldering



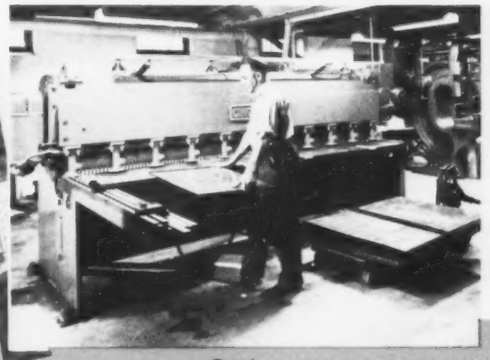
Welding



Drilling



Forming and Bending



Cutting

Roll Forming

welded for certain applications. Sharon also produces a titanium modified grade of 430 (430 Ti) which has superior bending qualities, is a better welding steel, and has superior corrosion resistance to that of regular 430.

A thin adherent scale is formed at temperatures as high as 1550°F. Formation of this protective scale, which does not crack away and reform, permits the use of Sharon '430' in intermittent heating operations.

Sharon '430' is suitable for a great many applications in products generally manufactured of other steels and metals. If the shortage of critical materials has threatened your production, consult with the Sharon office nearest you . . . '430' may be your answer.

TYPICAL APPLICATIONS *for Sharon 430 Stainless Steel . . .*

AUTOMOTIVE
- Grilles
- Horn rings
- Hub caps
- Mufflers
- Panels
- Trim
- Wheel rings
- Wheel covers
- Windshield wipers

CONSTRUCTION
- Decorative trim
- Down spouts
- Electrical hardware
- Flashings
- Gutters
- Kick plates
- Lighting
- Mouldings
- Roofing
- Screens
- Sheathing
- Spandrels
- Store fronts
- Tile and trim
- Window frames, channels and guides

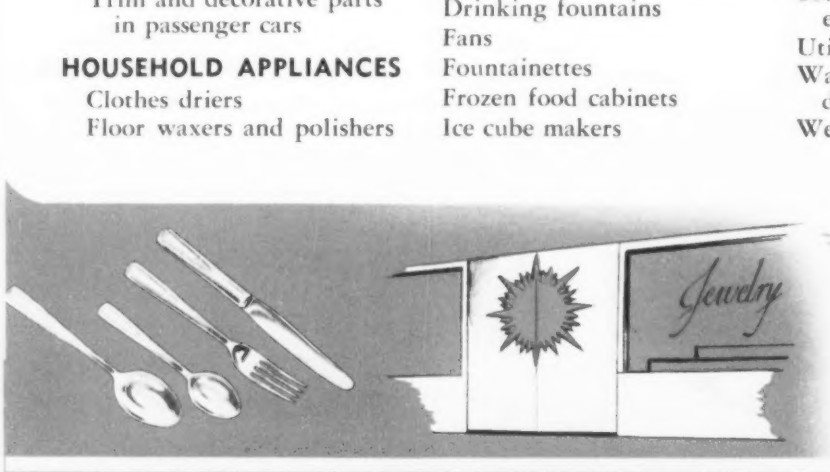
RAILROAD
- Diesel grilles
- Kick and push plates
- Refrigerator car parts
- Trim and decorative parts in passenger cars

HOUSEHOLD APPLIANCES
- Clothes driers
- Floor waxers and polishers
- Heating and cooking appliances
- Home and farm freezers
- Ironers and irons
- Lamps
- Ranges and stoves
- Refrigerators
- Refrigerator dishes
- Sewing machines
- Shavers, electric
- Toasters
- Vacuum cleaners
- Washing machines

KITCHEN
- Egg beaters
- Food serving trays
- Juicers
- Knives
- Mixers and mixing bowls and spoons
- Potato mashers
- Pots and pans
- Salt and condiment containers
- Spatulas

REFRIGERATION AND AIR-CONDITIONING
- Bottled beverage coolers
- Carbonated water systems
- Drinking fountains
- Fans
- Fountainettes
- Frozen food cabinets
- Ice cube makers
- Malt beverage dispensing system
- Refrigeration evaporators
- Refrigerator shelves and trim
- Room air conditioners
- Sandwich units
- Thermostats

GENERAL
- Ash trays
- Automatic vending machines
- Bar equipment
- Buttons and button parts
- Cheese slicers, commercial
- Cocktail shakers and accessories
- Cup holders
- Flatware
- Furniture
- Garden accessories
- Irons
- Jewelry
- Ladles
- Paint brush ferrules and rivets
- Radio and TV antennae
- Railings
- Refuse cans
- Rulers
- Soda fountains and equipment
- Utility cans
- Water pitchers and drinking cups
- Weather stripping



In these unsettled times you need all the information possible regarding materials and their use. Be sure to get your copy of this latest Sharon bulletin giving you up-to-the-minute information about Sharon '430' Stainless Steel. Contact one of the Sharon offices listed below or write direct and your copy will be in the return mail.

SHARON STEEL CORPORATION
GENERAL OFFICES — SHARON, PENNSYLVANIA

SALES OFFICES

CHICAGO 4, ILLINOIS
1822 McCormick Building
Phone: Harrison 7-2526

CINCINNATI 2, OHIO
2407-08 Carew Tower Bldg.
Phone: Main 1718

CLEVELAND 14, OHIO
1809 Union Commerce Building
Phone: Main 1-3135

DAYTON 2, OHIO
1801 Hulman Building
Phone: Fulton 5012

DETROIT 8, MICHIGAN
Tireman and Maple Avenue
Phone: Tiffany 6-1500

INDIANAPOLIS 4, IND.
425 Chamber of Commerce Building
Phone: Lincoln 7318

LOS ANGELES 13, CALIF.
524 South Spring Street
Phone: Mutual 5481

MILWAUKEE 2, WIS.
716 First Wisconsin National Bank Building
Phone: Broadway 2-7450

NEW YORK 18, N. Y.
500 Fifth Avenue
Phone: Pennsylvania 6-8744

PHILADELPHIA 3, PA.
1138 Broad St. Sta. Bldg.
Phone: Rittenhouse 6-0985

ROCHESTER 4, NEW YORK
503 Genesee Valley Trust Building
Phone: Baker 2540

SAN FRANCISCO 5, CALIF.
902 Monadnock Building
Phone: Garfield 4335

WASHINGTON 4, D. C.
Munsey Building
Phone: National 4874

CANADIAN REPRESENTATIVES

MONTREAL 3, QUEBEC
80 Prince Street
Phone: University 6-5761

TORONTO 17, ONTARIO
235 Wicksteed Avenue
Phone: Mayfair 0701

Continued from Page 78

Angle-type drills

Three new angle-type drills are powered to drill holes in aluminum or brass from 9/16 to ¾ in. diam, and in mild steel from ½ to 11/16 in. diam. The series comprises three different speed motors and five different angle attachments—all interchangeable—so that fifteen variations of speed and chuck size are available to meet any requirement accurately within the stated range. *Keller Tool Co.*

For more data circle No. 30 on postcard, p. 69.

Belt weighing system

A new conveyer belt weighing system is capable of electronically adding, subtracting and recording the tons per hour of material delivered to one or more points. The system developed jointly by Trans-Weight Co. and Minneapolis-Honeywell Regulator Co. is applicable for belt-conveyed materials ranging from low-grade ore to very fine bulk materials. Measurements can be transmitted over considerable distance, to a foreman's office or to a central control panel board. Chart records are also automatically maintained. *Minneapolis-Honeywell Regulator Co.*

For more data circle No. 31 on postcard, p. 69.

Glare reduction

Glare-Out, a clear, transparent blue-green coating, can be sprayed or rolled on windows or skylights to cut down heat and glare from the sun. It is permanent and will not peel, chip or wash off. One gallon covers 400 sq ft. *Fade-Proof Corp. of America.*

For more data circle No. 32 on postcard, p. 69.

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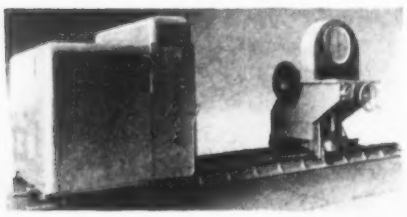


Torsion machine tests tool joints

Tool joints on oil well drill pipe are tested on a new torsion machine which measures torque in either direction of twist. Open chucks permit any length and size drill pipe to be run through the machine when doors on the drive unit are open. Torque up to 600,000 in.-lb can be measured. The machine is used solely for screwing up and unscrewing tool joints. *Baldwin-Lima-Hamilton Corp.*

For more data circle No. 33 on postcard, p. 69.

Descaling of steel

An alkaline electrolytic process for derusting metals is said to accomplish effective and complete scale removal by the use of periodic reverse current. The cathodic treatment removes rust without any attack upon the base metal. Also it reportedly produces a better surface for hard chromium plating with less danger of hydrogen embrittlement than when acid descaling is done. Enthone Compound 134 is used in a concentration ranging from 1 to 3 lb per gal. Current densities can range from 5 to several hundred amperes per square foot. *Enthone, Inc.*

For more data circle No. 34 on postcard, p. 69.

Precision measurement

Variables in temperature of gage blocks or work or both can be quickly checked with the new Temp-Check. Reading is obtained by placing the probe on the object to be measured and within minutes the actual temperature of the piece will be shown on the instrument dial. Standard model is calibrated from 60° to 100°F. Temp-Check is the size of a snapshot camera. *Webber-Gage Co.*

For more data circle No. 35 on postcard, p. 69.

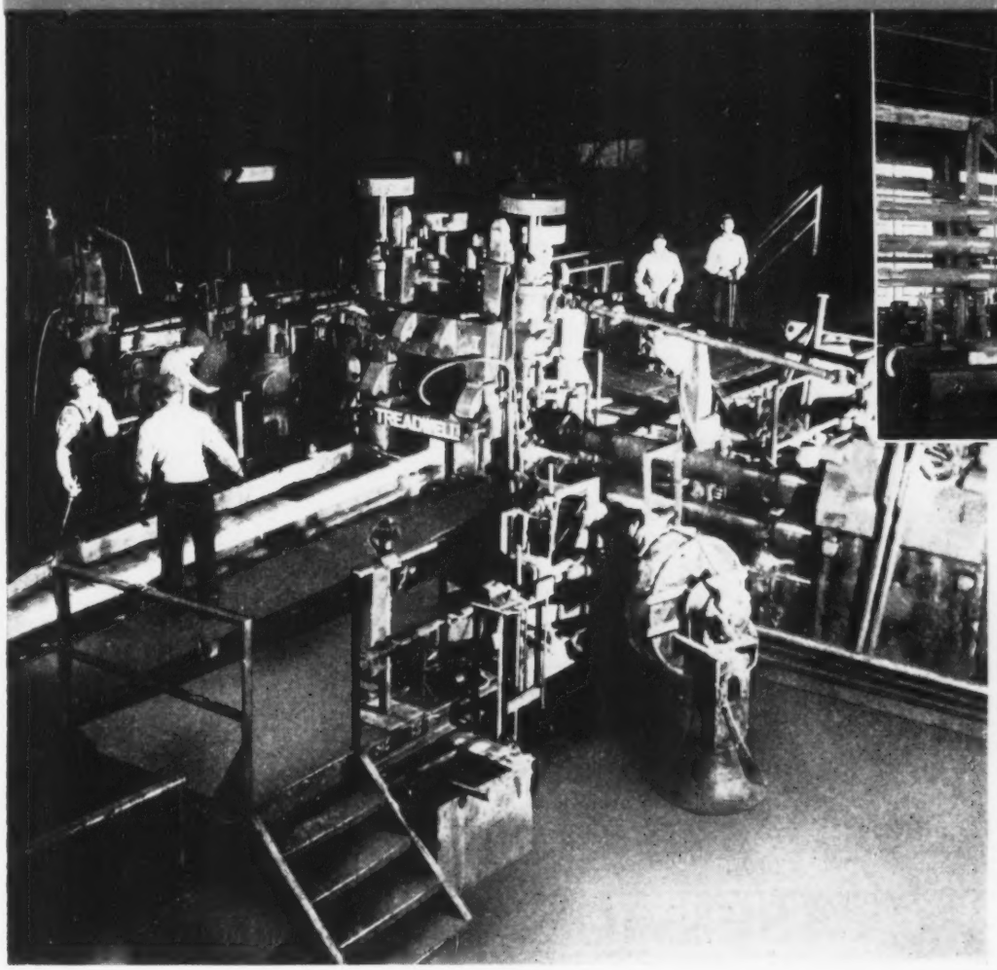
Die adapter

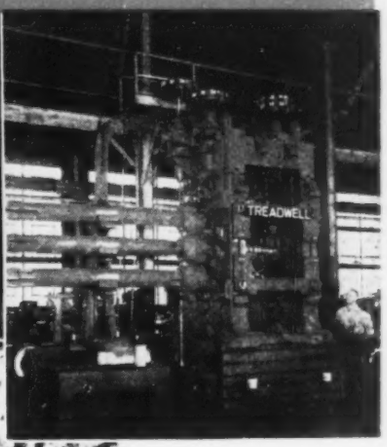
The same die can be used for many different resistance welding operations by means of the Nu-Twist die adapter. A quick change of electrode inserts is all that is necessary to adapt the die to various operations such as spot welding, projection welding, electrical upsetting and electro-brazing. The unit reduces to seconds the time necessary to change a welding machine die setup from one operation to another. *P. R. Mallory & Co., Inc.*

For more data circle No. 36 on postcard, p. 69.

Turn Page

Treadwell





Shop view of the roll stand with spindles

Three-High Mill for rolling precision rounds and squares up to and including 5" round or square. The mill is equipped with motor operated screw-downs for both top and bottom rolls.

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging
Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers

Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.

Beds, Cooling
Beds, Inspection
Bumpers, Furnace

Pushers, Furnace
Repeaters

Handling Equipment (Kick-offs, Pliers, Cradles, etc.)

Steel and Iron Castings
Ni-Hard and Ductile Iron Castings

BETTER GRADE MACHINERY

Treadwell Engineering Company

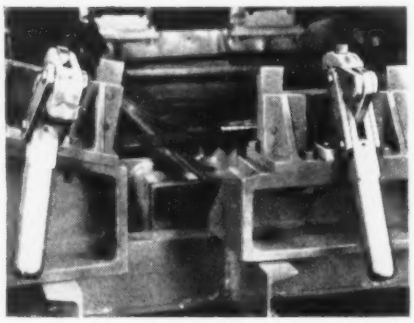
EASTON, PA.

SALES AND ENGINEERING OFFICES:

208 S. LA SALLE STREET
CHICAGO 4, ILL.
CEntral 6-9784

140 CEDAR STREET
NEW YORK 6, N. Y.
WOrth 4-3344

1217 FARMERS BANK BLDG.
PITTSBURGH 22, PA.
ATlantic 1-2883



Toggle clamps

Advantages of two lines of toggle clamps are fast action, long life at all pivot points because of hardened steel bushings, and precision manufacture. Merriman replaceable, hardened steel bushings, installed at all pivot points have a serrated surface that cuts its own bearing points. Minute shavings dislodged by this process wedge the bushings in tightly so there is no danger of their coming loose. The Thayer clamp provides holding pressure up to 2500 lb. The La-Ko lightweight clamp affords holding pressure to 650 lb. *E & E Engineering Co.*

For more data circle No. 37 on postcard, p. 69.

Spiral reamer

New spiral reamer cuts inside burr from pipe and conduit clean and fast with minimum effort or pressure; cuts holes in sheet metal also, smoothly and without chatter. Reamer capacity is ⅛ to 2 in. *Ridge Tool Co.*

For more data circle No. 38 on postcard, p. 69.

Rotary table

Designed for mounting small precision work, a new rotary table can be used on a drill press, milling machine, shaper or surface grinder. Accurately spacing drilled holes, indexing clutch teeth, milling circular grooves or T slots, machining square and hexagon shapes are some of the operations that can be performed on the table. Work table measures 4½ in. diam and rotates by worm gearing having a graduated collar and ball crank. Table edge is graduated 360°. A clamping lever locks the table in position. *South Bend Lathe.*

For more data circle No. 39 on postcard, p. 69.

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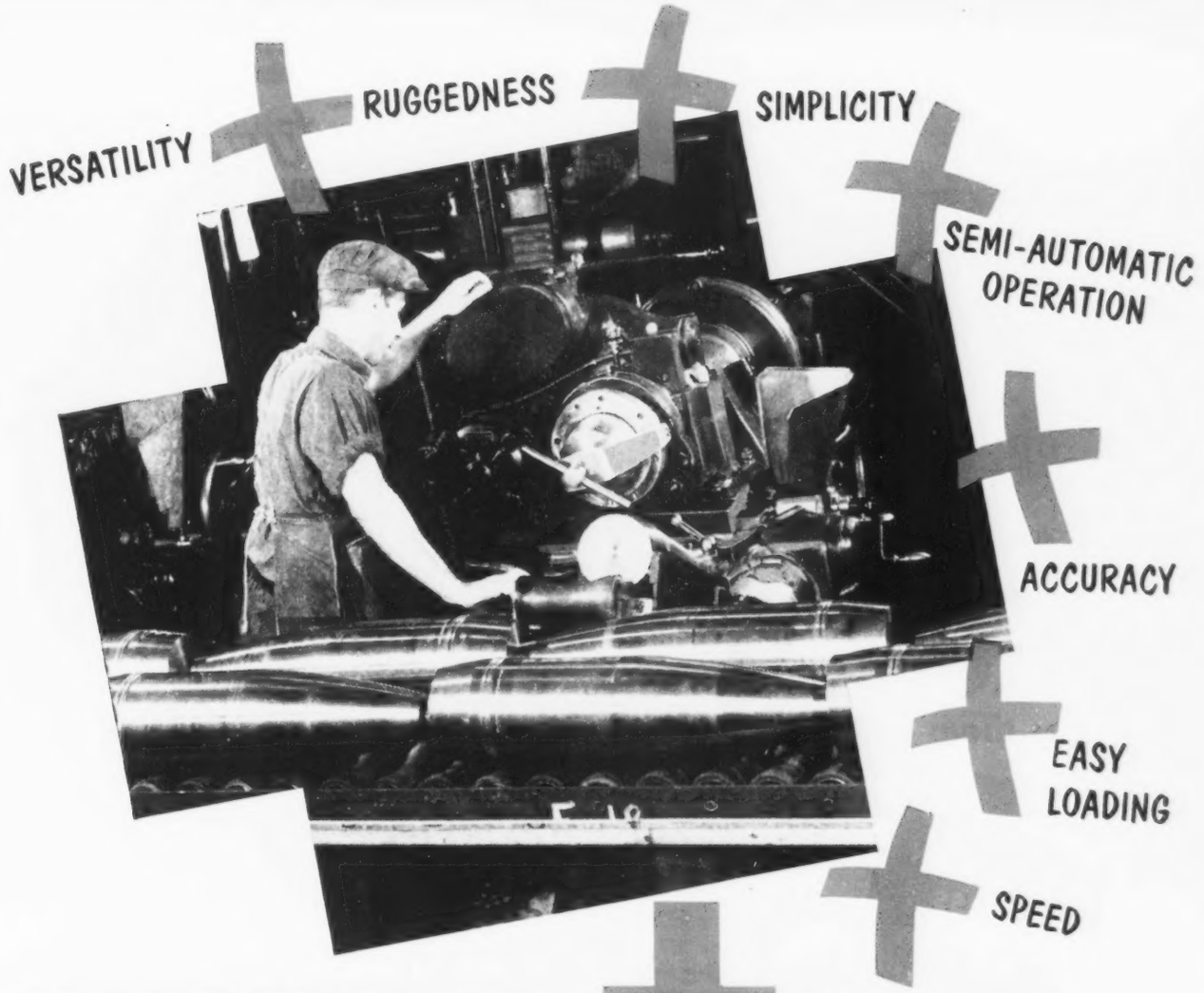


SURROUNDED BY PLUS VALUES

THE LEES-BRADNER "40" THREAD MILLER

It takes precision plus to thread shell cases accurately for the reception of delicate fuse mechanisms. Speed, easy loading and semi-automatic operation are other important considerations.

That's why the Lees-Bradner Model "40" Thread Miller was chosen to perform this highly important operation.

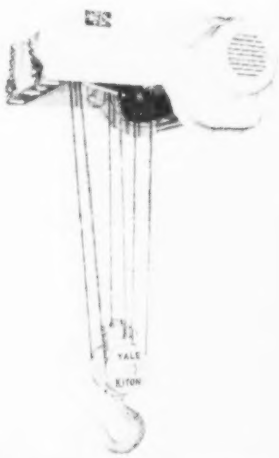
You, too, can get unusual accuracy at high speed and with a minimum of scrap on precision threading operations. Just contact your Lees-Bradner representative and ask him for all the details on this remarkable machine.

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.

New Equipment—

Continued



Bridge-crane hoists

New deck-type Cable King electric hoists are designed for top mounting in double-girder bridge cranes. Units, available from 1 to 15 tons, feature compactness of design; triple-reduction, spur-geared drive; totally-enclosed, fan-cooled motor; rugged heavy steel suspension frame; and pushbutton-operated heavy-duty contractor. For safety, hoists are equipped with two brakes. Control station can be in the crane or remotely located. *Yale & Towne Mfg. Co.*

For more data circle No. 10 on postcard, p. 69.

Indicator points

Durable carbide indicator points are available in convenient, time-saving sets. The wear resistant carbide tips take sudden gaging shocks and friction of rapidly revolving cylindrical pieces with ease and assure more precise gaging for longer periods. Each set has five standard shaped points: flat face, ball point, needle point, conical point, convex. Sets of six of any one shape are also available. *Eastern Tool Co.*

For more data circle No. 11 on postcard, p. 69.

Push-on fasteners

A push-on fastener is available in four types, each featuring a non-slip grip that bites deeper with use into the surface of the stud. Biting action is said to hold equally well on soft plastic, metal, fiber, or polished and ground studs, straight or tapered. The fastener will handle variations of 1/64 in. in stud dimension. *Prestole Corp.*

For more data circle No. 12 on postcard, p. 69.

Liquid rust inhibitor

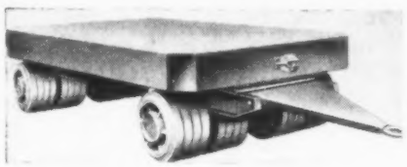
Anarust, a liquid rust inhibitor for wet blasting machines, is a material of organic composition, containing no chromates. It is soluble in hard or soft water, produces a clear colorless solution, is odorless, nonirritating to the skin, and not subject to bacterial decomposition. Used at ½ oz per gal of water, it is an effective agent in retarding rust on cast iron or steel parts which are being cleaned and washed after wet blasting. *American Wheelabrator & Equipment Corp.*

For more data circle No. 43 on postcard, p. 69.

New press control

A versatile type of control, available on the Denison Multipress, is a servo-type valving in the oil hydraulic press circuit that through its linkage with the hand control gives instant response ram action. Any pattern of ram action can be initiated by the operator himself. Rapid down pressure gives rapid ram traverse; quick up and down hand movement gives vibratory action. Minimum ram stroke is 1/16 in.; maximum, 6 to 15 in., depending on the model Multipress. *Denison Engineering Co.*

For more data circle No. 44 on postcard, p. 69.



Industrial trailer

With a capacity of 120,000 lb and equipped with eight, solid rubber-tired wheels, this heavy duty industrial trailer has a body framework of I beams and channels, with a deck surface of smooth steel. Two styles are available; one with fifth wheel on the front axle only; the other with fifth wheel on both front and back axles for extra maneuverability. Wide wheel base and low center of gravity prevent tipping. Basic size is 7½ ft wide x 12 ft long. *Phillips Mine & Mill Supply Co.*

For more data circle No. 45 on postcard, p. 69.

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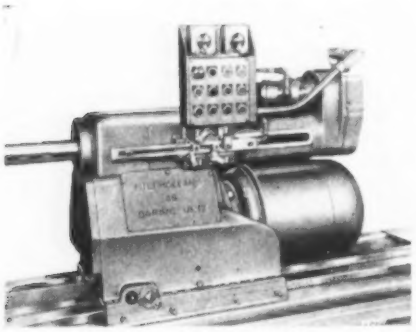
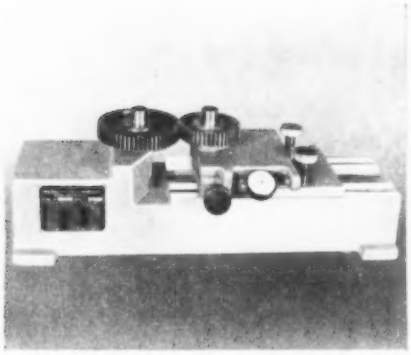


Fixed center boring mill has automatic cycle

The No. 3 boring unit is basically a fixed center horizontal boring mill with automatic cycle, having the following specifications: horsepower, 5 to 10; spindle speed, 33 to 500 rpm by pick off gears; diameter of spindle, 3 in.; Morse taper of spindle No. 5; length of bar stroke, 10 in. The boring unit body is heavily proportioned and box ribbed semi-steel casting. Feed mechanism is operated by a hydraulic pump and fluid motor. A system of valves and piping will allow cycle adjustments within the range specified. Feed changes are controlled by adjustable dogs contacting limit switches. *W. K. Milholland Machinery Co.*

For more data circle No. 46 on postcard, p. 69.



Bench unit checks external gears

Size, eccentricity and roll smoothness of spur and helical external gears can be checked on a new Model 602 bench type rolling fixture. It features a heavy cast iron base, scraped ways and hardened and ground ball ways. It can be used with an automatic recorder to place all readings on permanent charts. The gear to be checked is loaded on a vertical arbor that is moved into mesh with the master gear by an eccentric lever control. Turning the gear manually causes a 0.0005-in. indicator to show size, eccentricity and smoothness variations. Center distance of fixture is adjustable from 2 to 10 in. *Michigan Tool Co.*

For more data circle No. 47 on postcard, p. 69.

Loading dock shelters

Rugged canvas loading dock shelters extend outward on a collapsible steel framework to shelter truck or freight car loading doors of any size. They collapse flush against the building when not in use. Precision-constructed canvas wall curtains for use indoors as effective windbreakers, to stop cold drafts and heat loss also feature steel framework and the same rugged construction. They can be rolled up, shirred up or drawn aside quickly and easily. *Atlas Products Co.*

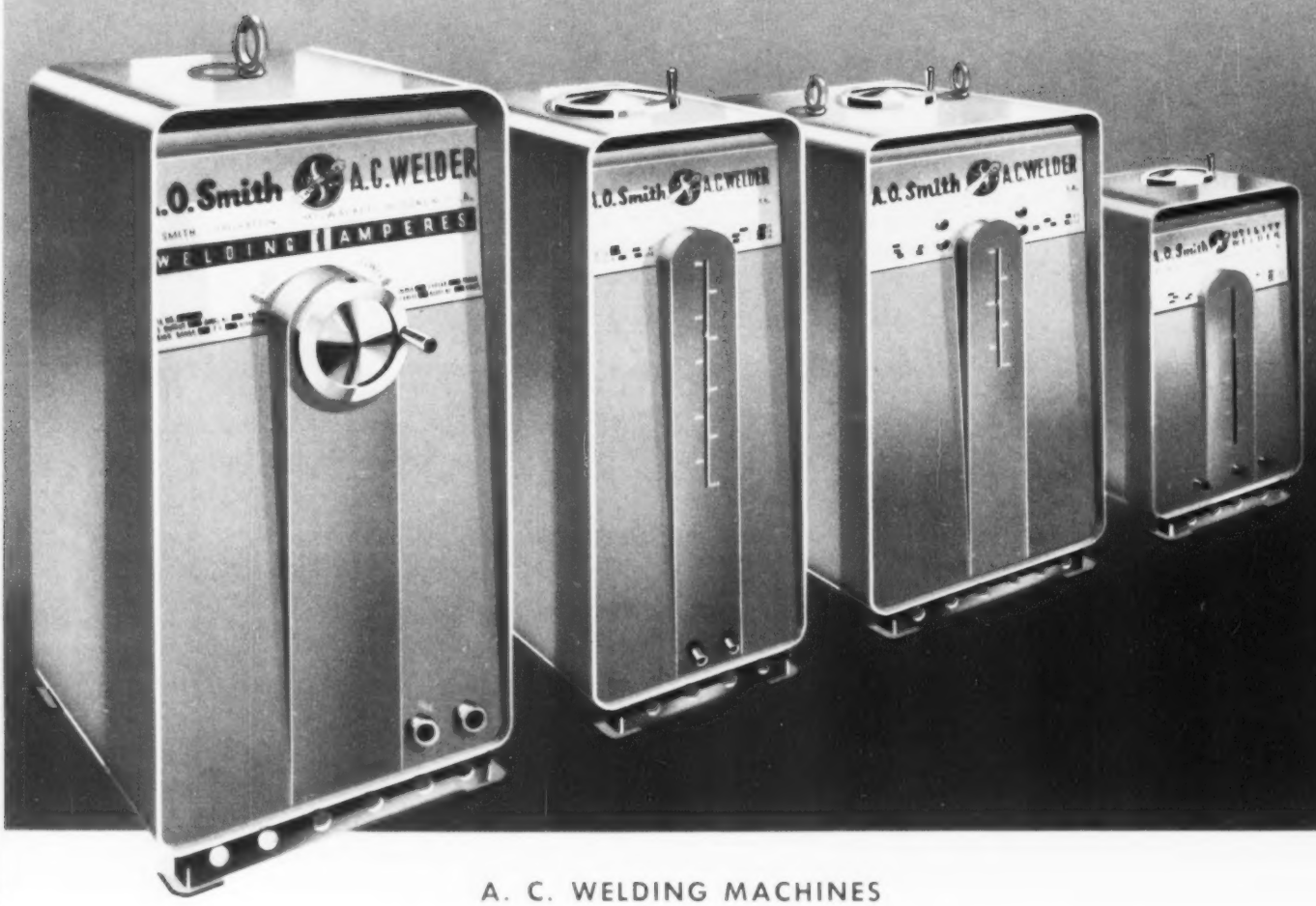
For more data circle No. 48 on postcard, p. 69.

Air blow gun

Positive two-stage throttling action of Tu-Flo air blow gun gets away from the danger and discomfort of having a cloud of dust, dirt, grit blown in the operator's face the second the air valve is released. For 9/10ths of the control button travel only a small volume of air is permitted. Operator pulls the button all the way if he wants the full blast. He has a choice. *Supreme Machine Products Co.*

For more data circle No. 49 on postcard, p. 69.

new era in welding!



A. C. WELDING MACHINES

Heavy-Duty CHAMPION

300-, 400- and 500-Amp. Production Welding Models. The extra years of service built into these machines make these models real welding champions.

The CHALLENGER

200-, 300- and 400-Amp. Production Welding Models featuring wide amperage range for adaptability to more jobs in any production welding shop.

The AUTO-MAN

650-Amp. Model. For Automatic or Manual Operation, singly or in multiple set-ups. Offers unusual flexibility for your welding requirements.

The UTILITY

An all-purpose Utility welder with 25 to 180 Amp. range for repair-shop, maintenance and farm use, and featuring production welder construction.

Made by Welders . . . for Welders

Production proved by one of the world's largest users of welding products

Now A. O. Smith advanced design... new plus features... give you the latest in welding machine efficiency

D. C. WELDING MACHINES

The D. C. RECTIFIER

200-, 300-, and 400-Amp. heavy-duty Production Welding Models for all d.c. jobs. The *one* rectifier-type welder designed to eliminate stack failure!

The FIELD KING Gasoline-Engine

200- and 300-Amp. Models. The most advanced of all engine-driven welding machines! Built for rugged jobs in the field. Welds with new speed and ease.

Redesigned to match *today's* welding requirements, *A. O. Smith advanced design welders* offer you the advantages of improved construction, top welding performance, and more operating benefits. A. O. Smith welders put you in the best position to cope with today's requirements and costs. Whether your welding is manual or automatic, A. C. or D. C., A. O. Smith welders assure you of having the finest power source available anywhere.

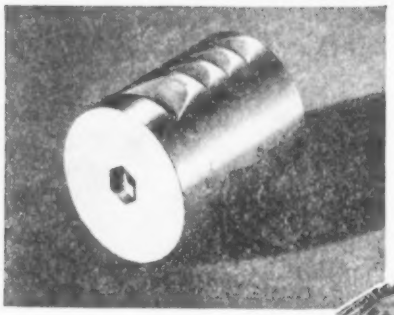
Ask your A. O. Smith representative, your A. O. Smith distributor or write us, for full details about these advanced design welding machines. *They merit your study.* A. O. Smith Corporation, P. O. Box 584, Milwaukee 1, Wisconsin.

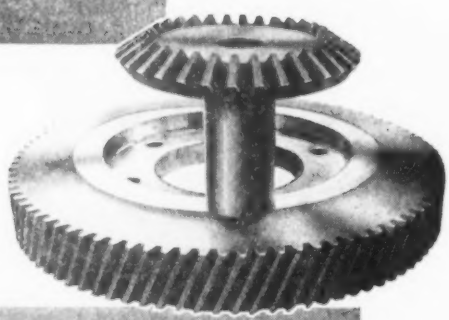
A.O.Smith

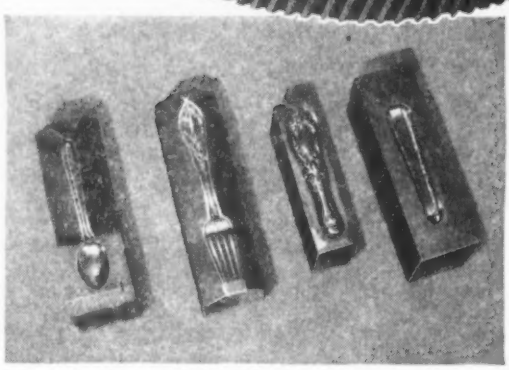
WELDING PRODUCTS

Tooling or Re-tooling?

L&N FURNACES HELP TOOLS PRODUCE MORE





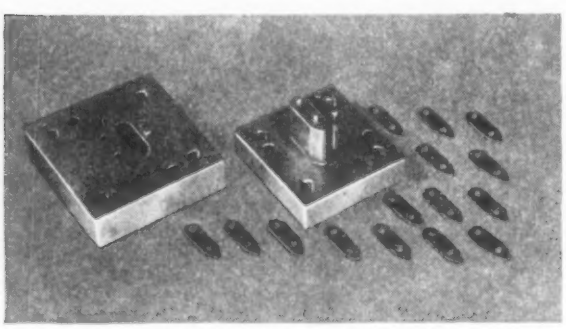


• Shown here are the tools and dies of some of the literally hundreds of firms that have found how to cut tool costs with Vapocarb-Hump Hardening and Homo Tempering Furnaces.

Butcher & Hart Co., Toledo, for instance, gets the uniform heating it needs to avoid distortion of the recessed head of cold-heading dies like the one shown.

The special gears of Sonoco Products Co., Hartsville, S.C., are heated with the uniformity needed to preserve their firm, true-running fit.

Towle silverware dies leave the Vapocarb-Hump furnace with never a particle of scale in their intricately carved detail—need none of the stoning and other time-consuming hand finishing that would be required if scale had developed.



Heat-Treating Costs Least, Adds Most to Tool Life

A cost analysis of the simple punch and die set shown above gives a picture of the relative costs of tool-making and of heat-treating, in producing a complete tool.

The toolmakers who shaped and assembled the punch and die used machine tools worth $31,000, beginning with the cutting off of the steel and ending with the final filing. And, the tool-making time was 21 man-hours.

The heat-treater, on the other hand, used Vapocarb-Hump Hardening and Homo Tool Tempering equipment costing, complete with controls, only $5,500; and he did both jobs in 3 hours.

In other words, heat-treating represents only one-sixth of the total tool cost, yet it is largely responsible for the future performance of the tools. This is a typical example of the familiar fact that it pays to give the heat-treater precision equipment in both furnaces and controls. Whether you're tooling or re-tooling, the heat-treat's comparatively small cost can make a big difference in tool life.

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Expansion program of this long-established firm has many features to attract outstanding recent graduates in engineering and science. Opportunities are in sales field engineering, product and application engineering, research, advertising, market development. Widely-respected policies assure recognition of progress and achievement. Address Personnel Manager for preliminary interview at nearest of 17 L&N offices.

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The Iron Age

SALUTES

James P. Growdon

This pioneering engineer led Alcoa's Taiya Valley planning . . . Building dams is his hobby.

WITH the exception of time out for two World Wars, Jim Growdon has spent 44 years in hydro-power engineering. The last 27 were with Aluminum Co. of America and he's had a hand in most of the company's large hydro-electric developments. Capping the list is his leadership in planning Alcoa's proposed Taiya Valley, Alaska, aluminum smelter.

On the side Jim has served as consultant for the Army, Navy, several foreign governments, public utilities, and firms of engineers and contractors.

Born in Pioneer, Iowa, in 1884, he has taken the name of his home town for a creed and led the way in many engineering developments. He is largely credited with adapting the vibrator principle to pouring concrete—now an almost universally used method.

He pioneered development of earth-faced rock-filled dams. The Navy's underground oil storage installation at Pearl Harbor is an achievement of his for which he won a Certificate of Merit. The list is long.

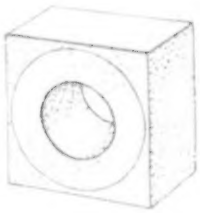
During World War I he rose from lieutenant to major in the Army Engineering Corps and was decorated with the Distinguished Service Cross and France's Croix de Guerre. As a colonel in World War II his abilities were invaluable on such jobs as reconstruction of bombed out power facilities in Italy.

Jim is extremely well known and liked in the engineering world. He is a very active member of the American Society of Military Engineers. Asked about the colonel's hobbies, one friend remarked "building dams." Now residing in Pittsburgh, the colonel does manage to play golf and is highly respected for his talents at bridge.

There's no end to the uses of economical

B&W KAOCAST

BURNER BLOCKS



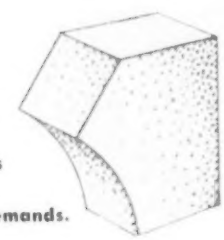
Kaocast lasted 3 to 6 times as long as previous refractory. Still going strong.

DOOR LININGS

Kaocast lasted 3 to 6 times as long as previous refractory—cut installation cost in half.

TUNNEL KILN CAR TOPS

Ordinary fireclay crumbled after few trips. Kaocast lasted 30 trips without deterioration.



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One power plant keeps a ton of Kaocast on hand for miscellaneous repairs because it is so versatile.

The list of plants who are discovering new, cost-saving uses of versatile B&W Kaocast keeps growing all the time. The reasons? This unique 3000 degree refractory castable can be molded in a hurry . . . cast directly in place . . . applied with a cement gun. It eliminates the need for a large inventory of special shapes. It has high resistance to spalling, low volume change, practically no reheat shrinkage. Want to know more? Ask your B&W Refractories Engineer—or write for Bulletin R-22.

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Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

The Iron Age

INTRODUCES

Stanley M. Vermeil, appointed secretary of the executive committee, KEYSTONE STEEL & WIRE CO., Peoria.

Edward R. Devlin, elected vice-president, THE ATLAS IRON & STEEL CO., INC., Philadelphia.

B. W. Kinderman, elected comptroller, DEWALT, INC., Lancaster, Pa.

Frank E. Myers, appointed vice-president of operations, SALEM-BROSIUS, INC., Pittsburgh; **John R. Wickwire**, named assistant to the vice-president of operations; **Thomas E. Lloyd**, named manager of sales; and **Carl J. Westling**, appointed chief engineer.

E. M. Slonaker, elected executive vice-president, WILLARD STORAGE BATTERY CO., of California. He succeeds Chester H. Starr, who is retiring.

Louis J. Sarosday, appointed vice-president, Engineering, J. B. BEAIRD CO., Shreveport, La.

Oscar W. Heimberger and **Robert M. Wallace**, elected vice-presidents, THE GRISCOM-RUSSELL CO.

Robert I. Roth, appointed vice-president in charge of western sales, WHITE-ROTH MACHINE CORP., Lorain, Ohio.

W. E. Santoro, appointed head of the Research Div., THE MONROE SANDER CORP., Long Island City, N. Y.

George P. Krumlauf, appointed metallurgical engineer, Pig Iron and Coal Chemicals Sales Div., REPUBLIC STEEL CORP., Cleveland. He succeeds the late T. G. Johnston.

Ernest O. Ohsol, named director of chemical engineering, PITTSBURGH COKE & CHEMICAL CO., Pittsburgh.

H. W. Tuttle, Jr., becomes executive vice-president, H. W. TUTTLE & CO.; **Herbert A. Speerstra**, named vice-president and director of purchases; **Warren A. Stuckey**, becomes vice-president and works manager; and **Max Rosenstein**, named vice-president in charge of electronic research.

R. F. Ledford, appointed director of sales and research, INDUSTRIAL FILTER & PUMP MFG. CO., Chicago.

Harry L. Reynolds, promoted to treasurer, THE THEW SHOVEL CO., Lorain, Ohio, and **Waid V. Clark**, named controller and secretary.

B. Frank Quintilian, elected vice-president in charge of engineering, GEROTOR MAY CORP., Baltimore.

Thomas J. O'Donnell, named head of the Physics Section, Ellectromechanical Div., ATLANTIC RESEARCH CORP., Alexandria, Va.; **Edwin F. Abrams**, becomes physical chemist; and **George C Pierce**, becomes sales and planning engineer.

Paul R. Rauch, appointed assistant chief inspector ,THE YOUNGSTOWN SHEET & TUBE CO., Youngstown.

Charles Carr, Sr., named manager, Steel Works Dept., WEIRTON STEEL CO., West Va.; **William McGarrity**, becomes assistant manager; and **Robert Allard**, promoted to assistant to the manager of the Steel Works.

John F. Bishop, appointed assistant general manager, Instrument Div., BECKMAN INSTRUMENTS, INC., South Pasadena, Calif.

Herbert C. Salzer, appointed assistant to the director of purchases, MOTOR WHEEL CORP., Lansing, Mich.

DANIEL T. WELLMAN, appointed president, The Wellman Bronze & Aluminum Co., Cleveland.

ROBERT S. SWEENEY, named vice-president and general manager, The Watson-Stillman Co., The Hydraulic Press Div., H. K. Porter Co., Inc.

WILLIAM P. CAROTHERS, appointed vice-president in charge of production, United Tube Corp., Cleveland.

Personnel

Continued

Paul J. Isvolt, appointed Cincinnati district sales manager, Acme Steel Products Div., ACME STEEL CO. He replaces **Neil L. Anderson**, who was transferred to Chicago offices as manager of the Steelstrap Dept.

Russell L. Sylvester, appointed manager of engineering and chief engineer, Equipment Div., NATIONAL RESEARCH CORP., Cambridge, Mass.

James R. Mohr, named manager of merchant products sales dept., Chicago office, American Steel & Wire Div., U. S. STEEL; **Charles P. Greenlee**, named assistant manager of sales Detroit.

E. C. Freeman, appointed factory manager, Trenton Michigan plant, CHRYSLER CORP.

John N. Allen, appointed district sales manager, THE AMERICAN BRASS CO., Cedar Rapids, Iowa, new district sales office.

John G. Holschuh, named manager newly created market research section, ELASTIC STOP NUT CORP. OF AMERICA, Union, N. J.

Allan F. Ives, named Pontiac Motor Div. Midwest regional manager, of GENERAL MOTORS CORP.

John E. Giere, appointed to Cleveland regional sales staff, UDYLITE CORP.

C. A. Walmsley, appointed district manager in charge of the St. Louis Car Plant, AMERICAN CAR & FOUNDRY CO., succeeding T. G. Shipley, who has retired.

E. W. Hazzard, appointed Corporation export manager, GAR WOOD INDUSTRIES, INC., Wayne, Mich.

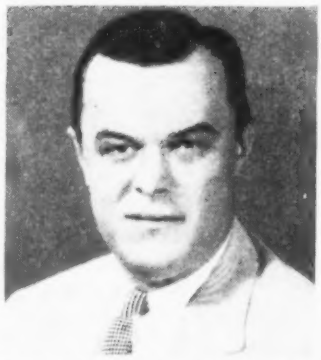
Setrak K. Derderian, appointed assistant general manager, METAL-HUDRIDES, INC., Beverly, Mass.

Richard Schermer, named manager of pump sales, THE DURIRON CO., INC., Dayton.

A. V. DeYot, transferred to Plastic Metals Plant in Johnstown, Pa., as manager, by THE NATIONAL RADIATOR CO.

Ernest H. Wyche, joins KENNETH TATOR ASSOCIATES, Coraopolis, Pennsylvania.

Carl E. Swift, appointed distributor for JESSOP STEEL CO., Washington, Pa.



R. D. HILL, appointed executive vice-president and treasurer, Taylor-Wharton Iron & Steel Co.

H. ALBERS, named chief engineer in charge of the U. S. A. F. heavy press program, Loewy Construction Co., Inc., subsidiary of Hydropress, Inc.

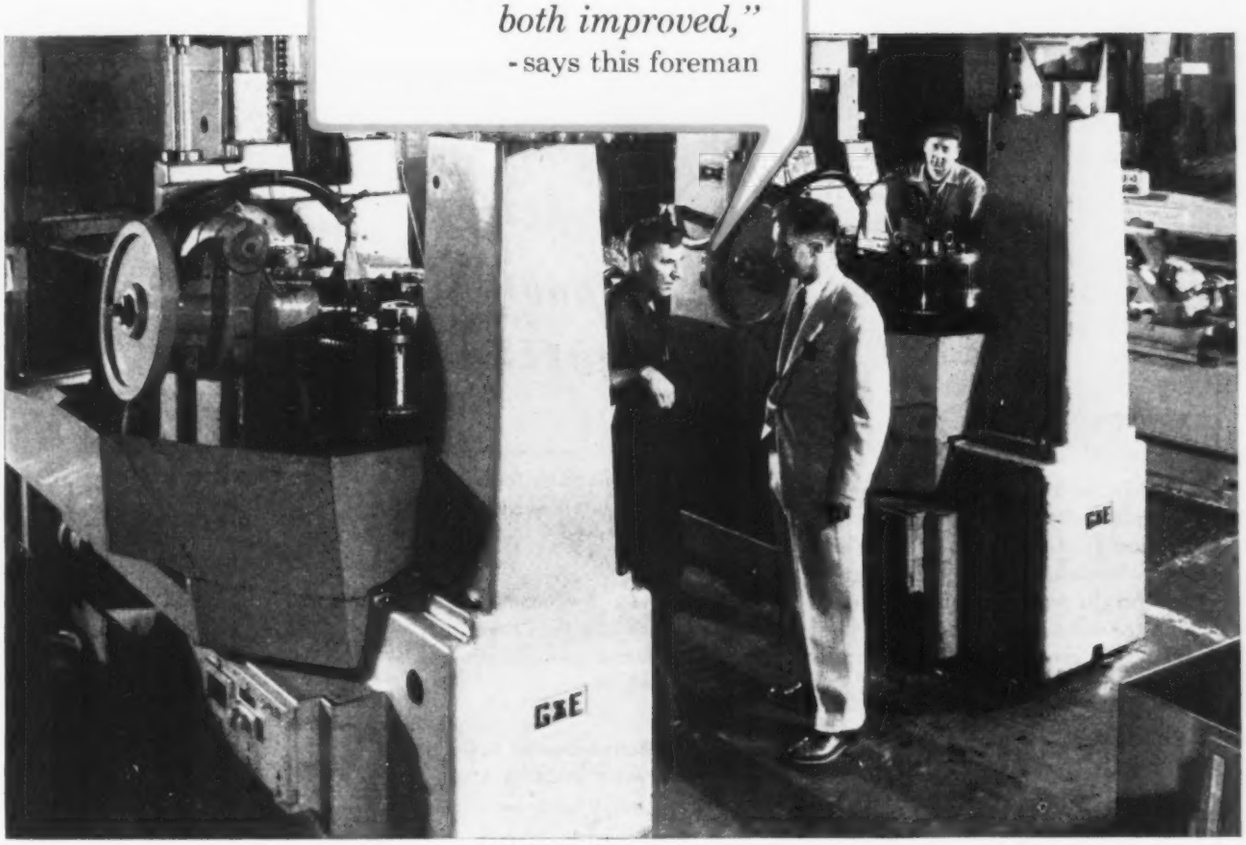
CHARLES T. EVANS, JR., appointed manager of high temperature metals, Universal-Cyclops Steel Corp., Bridgeville, Pa.

H. H. LENTZNER, named manager, Special Machinery Div., Kearney & Trecker Corp., Milwaukee.

alloy steel drive gears for M-47 tank

hob better with GULF ELECTRO CUTTING OIL!

"Hob life and tooth finish both improved,"
- says this foreman



Operation—cutting involute teeth on alloy steel spur gears, Gould and Eberhardt Gear Hobbers; results with Gulf Electro Cutting Oil—Hob life increased 20%, scuff marks eliminated on gear teeth, and hob grinding costs reduced.

Here's the important reason why Gulf Electro Cutting Oil produces outstanding results like these: Thanks to a special Gulf process of combining sulphur, it provides greater sulphur activity over the entire range of a cutting operation. This means longer tool life and better finishes.

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Company .....

Title .....

Address .....

Personnel

Continued

Robert D. Stottlemyer, appointed assistant division manager, Casper Wyoming, THE NATIONAL SUPPLY CO.

George Chipley, appointed Wisconsin representative, CONOFLOW CORP., Philadelphia.

John B. Ottman, appointed television-radio sales promotion manager, ADMIRAL CORP.

Philip C. King, appointed purchasing agent, METALS DISINTEGRATING CO., Elizabeth, N. J.

Vic Hassell, appointed midwestern sales representative, THE KAYNAR CO., Los Angeles.

Charles E. Sharp, becomes manager of customer service, AMERICAN WELDING & MFG. CO., Warren, Ohio.

Alan P. Benson, appointed extrusion sales representative, Michigan-Ohio territory, WISCO ALUMINUM CORP. of Detroit.

OBITUARIES

Leopold E. Block, 83, one of the founders of Inland Steel Co., Chicago, in St. Luke Hospital, Chicago.

George H. Fobian, president, The Oilgear Co., Milwaukee, recently.

Ben H. Knipe, 63, president, The Markle Steel Co., Houston, after a brief illness.

Edward L. Greene, 68, president, National Better Business Bureau, suddenly in his home at Mamaroneck, N. Y.

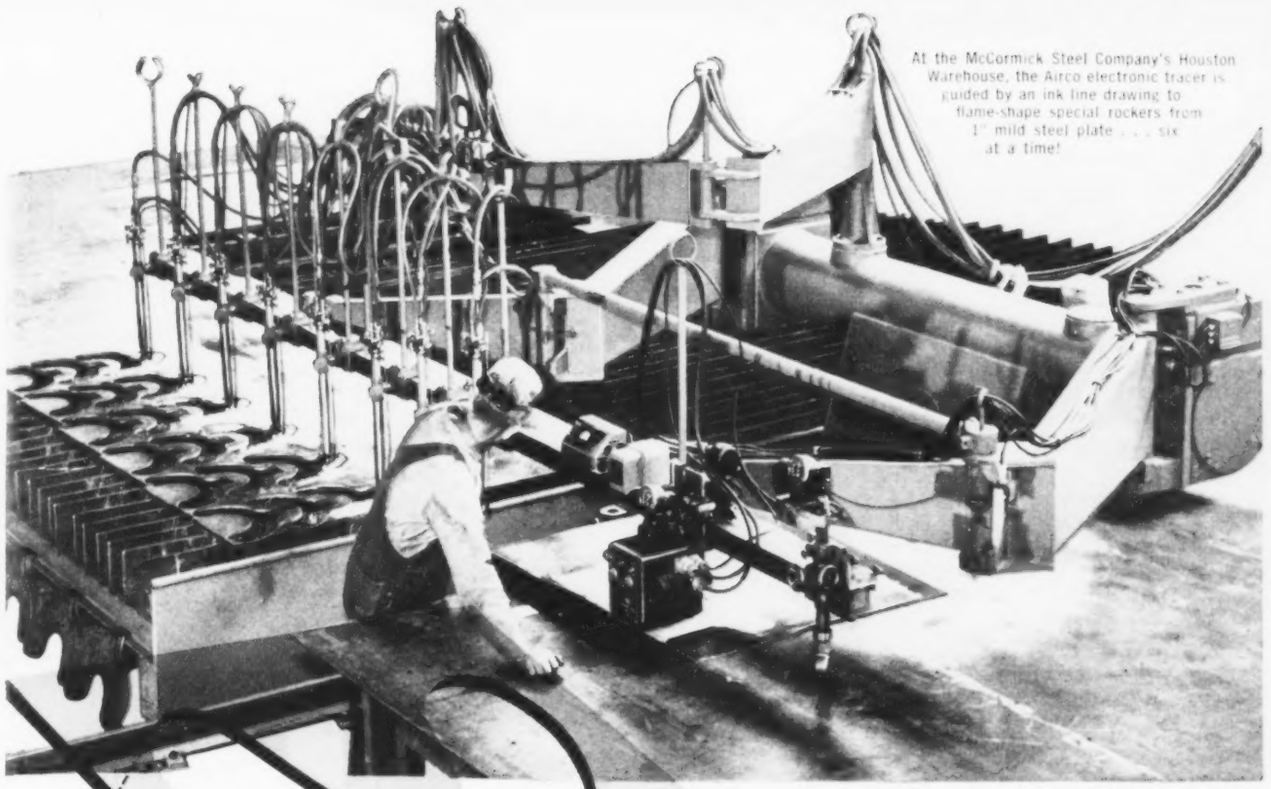
Paul B. Morgan, chairman of the board, Morgan Construction Co., Worcester, at his home there recently.

Arthur K. Higgins, 44, assistant director of research, Allis-Chalmers Mfg. Co., Milwaukee.

Russell R. Roeller, 60, general sales manager, Pennsylvania Salt Mfg. Co., in the Phoenixville, Pa., hospital after a brief illness.

Frank J. Clark, 72, pioneer salesman, Hanson-Van Winkle-Munning Co., Matawan, N. J., recently in Plainfield, N. J.

Apologies to **John M. Glasgow** who recently retired as manager of land department, Tennessee Coal & Iron Div., U. S. Steel, and whose name mistakenly appeared in this column.



At the McCormick Steel Company's Houston Warehouse, the Airco electronic tracer is guided by an ink line drawing to flame-shape special rockers from 1" mild steel plate . . . six at a time!

a steel warehouse with a "custom-cutting" department!

That's McCormick Steel of Houston, Texas! By installing an Airco No. 50 multi-torch cutting machine, they've boosted steel orders with an entirely new type of service . . .

Here's how it works: customers supply an outline drawing or paper cutout of the required part. An "electronic eye" traces the guide with hairline accuracy. Irregular shapes, inside and outside square corners, obtuse angles, slim slots and intricate contours — the Airco No. 50 Travograph takes 'em all in stride. Circles up to 12 feet in diameter — thicknesses up to 6 inches! By keeping all 8 torches in operation, McCormick mass produces intricate shapes so accurately that further machining is, in most cases, unnecessary.

The Airco No. 50 Travograph cuts light plates, heavy slabs, billets or forgings . . . to minute tolerances . . . with virtually no limit on shape or size. Complete details are available by contacting your nearest Airco office.

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Technical Articles

Foundries report on BASIC ELECTRIC ARC PRACTICES

By T. N. Armstrong
Development and Research Div.
International Nickel Co., Inc.
New York

A survey of 25 foundries, representing about 75 pct of the total using basic electric arc furnaces for melting ferritic steels, shows the trends and significant differences in melting practice. Some foundries use the same furnaces for melting stainless and high alloy steels. Not included in the survey are foundries making stainless, heat-resistant and Hadfield's manganese steel castings exclusively. Without high grade scrap in many areas, the trend is away from acid electric furnace practice. As a move in this direction, some foundries have already converted to basic furnaces while others are considering such a step.

Current requirements for cast steel parts of military equipment have imposed problems not usually encountered with industrial castings. Many military castings must be resistant to shock loading of high magnitude at extremely low temperatures. In addition, these parts are required to function as structural members subject to high static and cyclic stresses. It appears that sulfur and phosphorus limits must be more restrictive than for commercial steel castings if these severe requirements are to be met consistently.

The need for steel of low sulfur and phosphorus content and the absence of high grade scrap in some areas have revived an interest in basic electric steel for castings. This trend is

Operators rate capacity on the average weight of the charge rather than on the shell diameter . . . Widely used furnaces are 3 and 6-ton sizes . . . Most foundries operate on a full scrap charge . . .

shown in the chart in Fig. 1. Several foundries already have converted one or more furnaces from acid to basic and others are considering the move.

In basic electric arc practice, most operators rate capacity on the average weight of the charge rather than on the shell diameter or the melting rate per hr. Of fifty furnaces from 1600-lb to 25-ton capacity, no one size predominates but 3 and 6-ton sizes are most widely used. Fig. 2 shows a modern 6-ton electric Pittsburgh Lectromelt furnace. Newer furnaces have removable tops and are charged mechanically, as shown in Fig. 3, whereas older furnaces with fixed tops generally are charged by hand, aided by a chute.

Seven foundries prepare the furnace bottom by sintering; the remainder use rammed magnesite and burn in the entire bottom in one operation. The trend is away from silica to high alumina brick for roofs. Some operators use high alumina brick in the outer courses and silica brick in the center because in continuous operation silica brick roofs spall excessively.

No standard sidewall

There seems to be no standard practice for side wall construction. Silica brick is used most frequently above the slag line but some operators prefer magnesite brick. A few shops use rammed ganister linings with success.

Three general practices are used for melting steel castings in the basic arc furnace. Most common is the conventional two slag process in which steel is melted down under oxidizing conditions, the slag skimmed and the melt finished under a slightly reducing white slag. The reducing slag consists of a mixture of lime and fluorspar with an addition of carbon or silicon or aluminum. The two slag process is still used in more than 60 pct of the foundries operating basic as it is the most effective practice for reducing sulfur and phosphorus. Both sulfur and phosphorus will usually be under 0.020 pct in the double slag process and, with a high grade of scrap, sulfur may finish as low as 0.010 pct.

Next is the single slag process in which the charge is melted under an oxidizing slag but the slag is converted to a reducing condition for finishing by the addition of crushed ferrosilicon and sometimes a small addition of carbon in the form of crushed coke or crushed graphite. Phosphorus drop is negligible with this practice but there is a reduction in sulfur. Final sulfur is usually under 0.025 pct.

The third practice is a single slag process in which the slag is always on the oxidizing side. Toward the end of the melt, oxygen content of the slag drops and the color after cooling is brownish. Claims are made for a slight reduction in both phosphorus and sulfur, the drop for each being not more than 0.005 pct. The principal advantages of this practice appear to be the relative low cost and improved fluidity of the melt.

Most foundries operate on a full scrap charge. About 1 pct ore is added with the charge and the bath on meltdown is about 0.10 pct above the final desired carbon. If necessary,ore may be added to bring the carbon down to the desired level. Some operators prefer to knock the carbon down to about 0.10 pct below the desired level and recarburize. About 25 pct of the foundries use oxygen either as regular practice or on occasional melts.

Deoxidation practice varies considerably. Most final additions of ferromanganese and ferrosilicon are made in the furnace. All but about 6 shops add aluminum to the ladle. About 50 pct of the foundries add a calcium-manganese-silicon alloy to the ladle. A few also add ferrotitanium, usually in conjunction with the calcium-manganese-silicon. Only 1 foundry uses zirconium. At least 3 foundries using calcium-managanese-silicon and titanium do not use aluminum and report no dif-

WHAT IS POPULAR AMONG FOUNDRIES USING BASIC ELECTRIC ARC FURNACES?

Furnace capacity	Most use 3 to 6-ton capacity
Furnace bottoms	72 pct use rammed magnesite
Furnace roofs	Trend is from silica to high alumina brick
Side wall construction	Silica brick is most common
Charging	Most operate on full scrap charge (no pig)
Melting	25 pct use oxygen
Slag reduction	60 pct use double-slag method
Refining	Most add ferromanganese and ferrosilicon in furnace
	76 pct add aluminum to ladle
	50 pct add Ca-Mn-Si alloy to ladle

ficulty with pinhole porosity in castings poured in green sand molds. All use a double slag practice and may add some aluminum to the reducing slag.

Melts made in the basic furnace and finished under a reducing slag usually do not have as good fluidity as acid melts, but melts finished under an oxidizing or brown slag are said to be equally as fluid as acid steel. However, lack of adequate fluidity is no longer a major foundry problem with basic electric steel. About 20 pct of the foundries are shanking their basic melts.

Most of the furnaces start with a meltdown voltage of around 200 and finish the melt at around 100 v. The highest voltage is 250 v and the lowest 90 v.

Meltdown time varies considerably but the average is about 2 hr. The shortest time is 70 min and the longest is 3 hr.

Total furnace time under power also varies widely even with the same size furnaces and with the same practice but time is shortest with the single slag process. Several shops use a single slag tap regularly 2 hr after power is turned on. Average time with double slag is about 3½ hr while longest time is 4½ hr.

Average 515 kw-hr per ton

Power consumption per ton of metal poured differs among the foundries due to a number of factors. The lowest consumption, 475 kw-hr per ton, is in a shop using oxygen and a single slag, but finishing with the slag in the reducing condition. The highest consumption, 750 kw-hr per ton, is in a 10-ton furnace apparently overcharged or underpowered. The median is about 515 kw-hr per ton for single slag and about 550 kw-hr per ton for double slag.

The reasons advanced for using basic practice are to control sulfur and phosphorus and to recover oxidizable alloys. Many foundries, some of which use both acid and basic practice, have less cracking and the steel is cleaner than acid steel. Some consider the basic process more flexible. Basic furnaces are used for melts that must meet exacting specification requirements and the acid furnaces for the general run of castings. In these foundries the phosphorus and sulfur content of the foundry return scrap is maintained at a considerably lower level than in shops operating with acid practice exclusively. Foundry scrap, when mixed with purchased scrap, helps keep sulfur and phosphorus within tolerable limits in the acid melts.

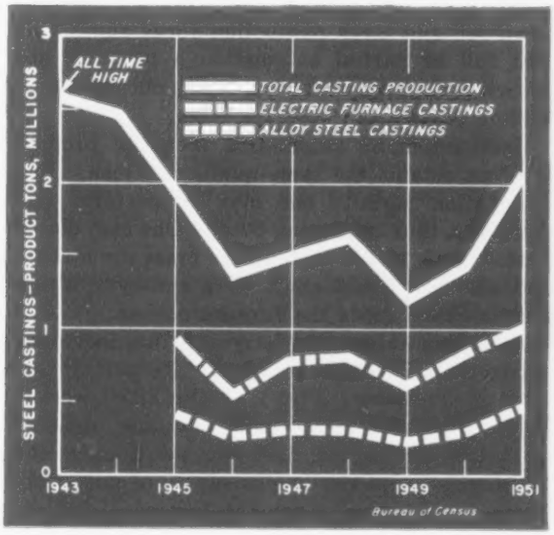

FIG. 1—Steel casting tonnage from 1943 to 1951.

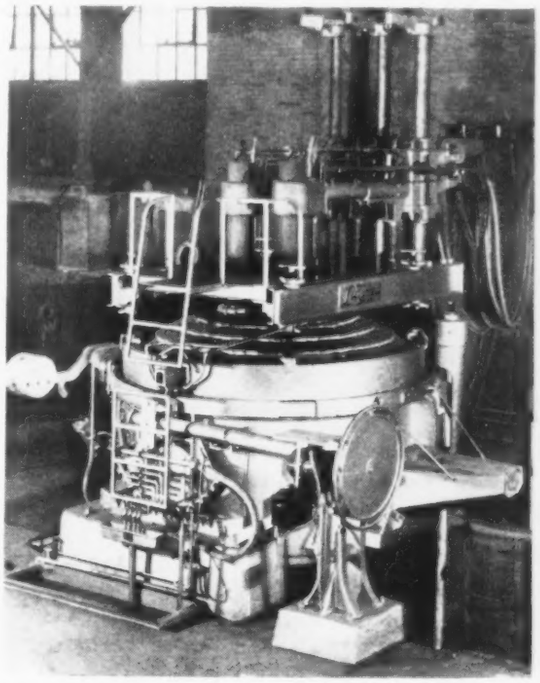

FIG. 2—A modern 6-ton capacity basic electric arc furnace in normal operating position.

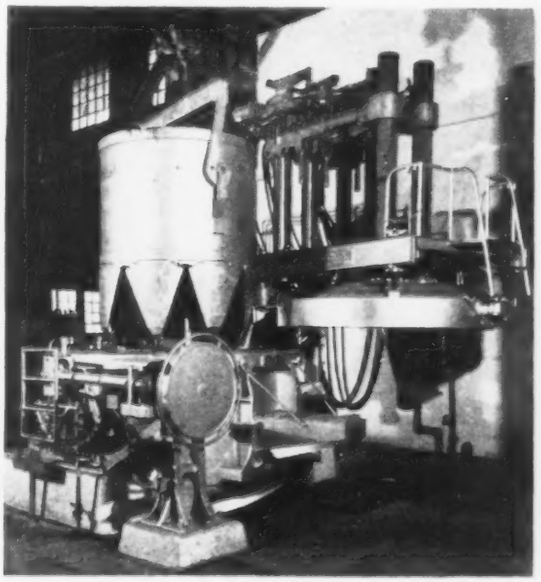

FIG. 3—An electric arc furnace having a removable top is charged by a drop bottom bucket.

Keep forgings moving—

AUTOMATION

Cuts forging costs,

By E. G. de Coriolis
Director of Research

and

J. D. Nesbitt
Development Engineer
Surface Combustion Corp.
Toledo

Automation is just around the corner for forge shops—large and small. Plants once stymied by the limits of operator skill and lack of fast heating equipment, now have new, faster production methods available. Faster forging machines, fed by high speed heating furnaces, and use of modern transfer equipment have made automation in the forge shop practical. Higher output per man hour, improved quality, and lower costs resulted.

Principles of automation generally applied in automotive machine shops, press departments and even in the foundries,[1] have not been widely applied in forging practice.

Limiting factors preventing applications of automation to the forging industry have been:

1—Predominant use of forging hammers requiring highly skilled operators. Operating speed was, therefore, dependent on the skill and capacity of the hammerman as well as equipment speed limitations.

2—Use of manually fed and discharged batch type furnaces which were frequently the bottleneck in production.

In recent years forging machines (vertical presses and horizontal upsetters) have taken over a large number of operations in the forging industry. Practical production limits for such equipment are set only by ability to supply hot billets, transfer from one die station to another and remove forgings to auxiliary equipment such as trim presses and other forming equipment.

However, scale is not removed from billet surfaces by press or upsetter forging. The scale is either embedded in the surface of the forging or remains in die cavities causing excessive die wear and requiring frequent shutdowns for die maintenance.

These factors have resulted in a need for the development and application of high speed heaters capable of delivering uniformly heated steel to forging equipment on a fixed cycle setting the pace for the operation. Attainable production rates with this type of heating have surpassed the ability of crew members to handle the billets —thus the possible application of automation principles to modern forging equipment.

Since automation in the forge shop will be less costly than in machine and press shops, both small job and large production forge shops will find full or partial automation a practical approach to the problem of increasing output, maintaining quality and lowering costs.

Semi-automatic automation increases production but retains the same number of men. But automation permits one man to perform two functions, thus increasing output. One man places heated work pieces on the first press die station and also loads cold stock on a conveyer which automatically feeds the furnace pusher.

A leading automotive forge shop has increased production of ring gears nearly 100 pct by this type of application, Fig. 1. An unskilled worker loads billets on a conveyer and also delivers heated billets to the first die position in the forging press. A continuous supply of uniformly heated steel to the operator is assured. Hundreds of steps every day and much physical lifting is eliminated.

"Increases production and reduces manpower . . . High speed heaters used . . . stock is delivered by gravity to upsetter . . ."

ts, Improves quality

Semi-automatic installations can also reduce manpower. Hopper type feeders for two or more furnaces are supplied from a single point or by one man. This eliminates one man from each crew but one. Most forge shops estimate saving from elimination of one man per shift at $8000 to $12,000 per year. In most cases automatic equipment of this type can be amortized in one year or less, on a single shift operation. Savings for three shift operation are correspondingly higher.

An outstanding example involves a battery of high speed heaters used in upsetting automotive door hinges. Each furnace, with hopperfeed and gravity discharge, is designed for operation in pairs. As shown in Fig. 2, one man loads both hoppers. Heated stock is delivered by gravity to upsetter operator. Output per usetter has been more than doubled by this arrangement.

Fully-automatic operation both increases production and reduces manpower. Stock is loaded in bundles to feeding device or fed singly from preceding operation. Furnace is completely mechanized and discharges to indexing position from whence it is automatically fed to forging or hot-forming operation.

Steel bars, for example, are now being fed automatically into a new slot type 4-zone, high speed heating furnace. The furnace is 21 ft long and capable of heating from 200 to 2400 pieces per hr, Fig. 3. For lower rates, individual sections of the furnace are shut down. This particular application is fully automatic from shearing, chamfering and heating to the flying "slitter."

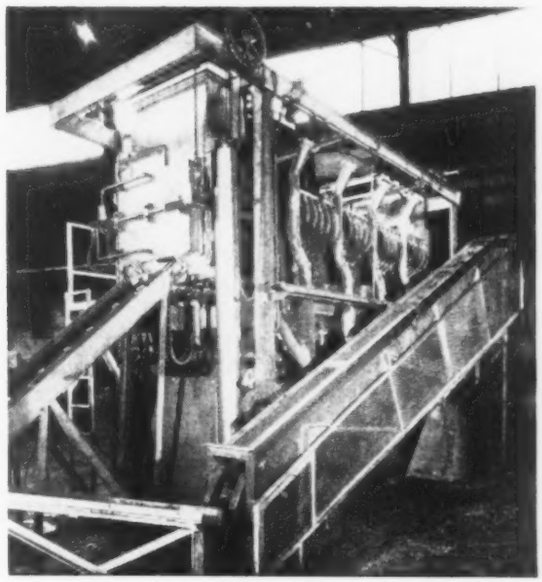

FIG. 1—Barrel type high speed gas furnace with automatic conveyer system for charging and discharging ring gear billets. One operator loads billets, feeds presses.

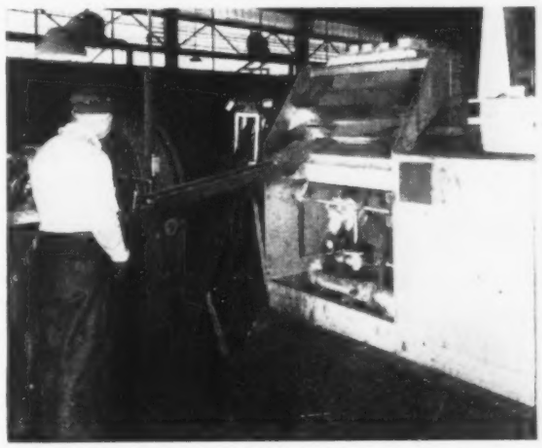

FIG. 2—Pair of high speed heaters, with hopperfeed and gravity discharge, are fed by one man. They discharge in opposite directions to upsetter operators.

ADVANTAGES FOR FORGE SHOPS

Advantages claimed for a forging operation in which high speed billet heating is combined with automatic materials handling:

1—Greatly increased output per man-hour without increasing present investment in forging equipment.

2—Steady flow of uniformly heated material to the operator is controlled by the furnace cycle, permitting maximum output of quality forgings.

3—Greater output per sq ft of floor space.

4—Savings of as much as one-half in investment as compared with some other fast heating methods.

5—Increased die life, resulting from comparative freedom from scale and uniform temperature of the heated billets.

6—Low maintenance expense.

7—Outstanding adaptability to stock size changes. In many cases, only the materials handling fixtures outside the heating furnace need to be changed.

8—Gas or oil firing can be used.

9—Furnace heat can be kept away from the operator.

"Entire bar is heated in a high speed heater . . . Five pieces may be forged without reheating . . ."

Conveyer speed is interlocked with "slitter" action.

The trend toward automatic upsetter operations is well advanced. In one installation, bars are cut into short lengths. The entire bar is then heated in a high speed heater and as many as five pieces may be forged to shape without reheating. Eventually, this may become one of the most widely employed applications for high speed heaters.

Fully automatic handling of bars or billets from the bar yard to the finished forging are not yet entirely practical although such installations are being considered.

High speed furnace design can be adapted efficiently to either overall or selective heating. Barrel and split barrel, with single nozzle burners and slot type with impact line burners designs are in use.

Barrel-type furnaces have sectional cylindrical heating chambers. Each section consists of a refractory lined steel shell, equipped with tangentially firing burner ports on relatively close centers, Fig. 4.

Lining thickness up to 7½ in. minimizes heat losses and heat storage. Portions of the furnace exposed to maximum temperatures are lined with high temperature castable refractory. These elements include heating sections, the charge openings, a portion of the exhaust stacks and skid support piers.

Billets can be charged on one or more rows in the barrel type furnace, by means of a hydraulic pusher. A wide range of stock lengths can be accommodated without adjustments. Pusher stroke length is self adjusting. Where production requirements permit, fixed stroke mechanical pusher systems are sometimes used.

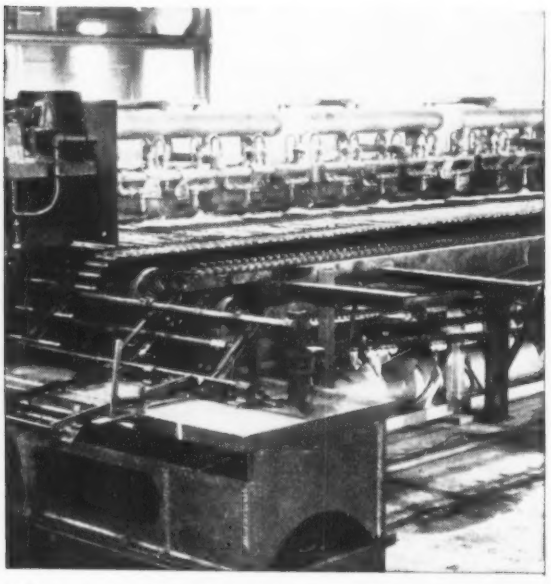

FIG. 3—Four-zone slot type high speed heater fully automated from stock feed shearing, chamfering and heating to flying slitter operations.

Another type of high speed heating equipment in common use on automated applications consists in opposed or overfired water cooled slot type burners. This type of equipment is usually used for selective or partial heating as shown in Figs. 2 and 3. Opposed firing, as shown in Fig. 2, is generally used for heating flat work pieces. The slot burner-impact bed combination, Fig. 5, is used for bar end heating. The latter equipment is readily adaptable for small diameter slug heating.

A fairly wide range of stock sizes can be accommodated by a single rail spacing and any desired range can be handled by use of alternate rails as required in the barrel type. Any part size which will fit in the heating chamber and allow adequate clearances for uniform radiation and circulation of combustion products will be properly heated in both barrel and slot designs.

Raising the furnace permits feed by gravity to the forging hammer or press at any desired elevation and location of auxiliary equipment beneath the furnace.

Unusually rapid heating

The principle of high thermal head operation makes possible unusually rapid heating. Whereas a conventional fuel-fired furnace will require 20 to 30 min per inch of billet thickness to raise the temperature to the forging level, and a rotary type furnace will require 15 min per inch of thickness, a fuel-fired high speed furnace requires only 2½ to 3 min per inch of section.

The combination of high velocity and centrifugal action causes the heated gas-air mixture to hug the refractory surfaces where combustion is extremely rapid and complete. Partially burned gases do not contact the work surfaces.

Using this method of combustion, the inner surface of the refractory lining becomes a radiant burner face capable of imparting heat energy at great intensity on all exposed work surfaces.

High furnace operating temperatures can be reached very quickly.[2] A typical furnace may be heated to 2500°F within 30 min. Maximum temperature of 2700°F can be attained in an hour. In the high sped type furnace, the furnace temperature is held in the range 2600° to 2700°F. Cycling time is determined by the time necessary to raise the temperature of the billet to the desired level. "Soaking" time, in the furnace, is eliminated.

While the surface of the billet may cool rapidly when first removed from the furnace, the fact that the temperature of the core is still rising as the piece leaves the furnace helps to maintain billet temperature. Also, because of the short time at the forging temperature, grain growth is less than for conventional heating and scaling is considerably reduced. Fine grain, it is believed, con-

tributes to the reduced forging pressures required in shops using high speed fuel-fired heating.

Uniform temperature of the rapidly heated billets undoubtedly contributes to improved forging die life reported by forge operators. In addition to more uniform heating, a slightly higher billet temperature is permitted without endangering the heating equipment or causing excessive grain growth.

Billets up to 10 in. thick weighing over 1000 lb have been heated successfully by the high speed method. Larger automated installations are now being planned for both ferrous and nonferrous forging.

The high temperatures required for forging create special problems, involving the expansion and contraction of metals and refractories. The new furnaces are designed to meet this situation. Most of these furnaces are anchored to structural framework at the charge end. The entire cylindrical steel furnace rests on rollers with the hot end of the furnace spring loaded. As the furnace is heated, it expands against the springs—in some cases as much as 1 in. As the furnace cools off, the spring action forces it back to its original position.

There is no appreciable expansion in the water cooled rails. The barrel type furnace shown in Fig. 4 has 40 burners, arranged 20 per side in groups of five, firing tangent to the inner periphery of the refractory lining. Work is carried through the furnace at the approximate center of the heating chamber.

Close control of the air-gas mixture is maintained with either premix or nozzle-mix firing. For premix installations, gas is completely premixed before it is supplied to two manifolds which are located on each side of the furnace structure. The mixture is then forced through burner connections made of flexible steel tubing for distribution to each burner. Mixture pressure entering the manifolds is 2 psi.

Nozzle mixing burner equipment is also available which will give the same operating results and performance as previously described premix firing. It has the additional advantages of elimination of premix manifolds, simplified and more economical piping, greater turndown and is more readily adaptable to oil application. Control of fuel-air ratio is achieved in both cases by balancing gas pressure against air pressure upstream of supply line orfices. Eventually many forge shops will operate with much less manual effort. Fig. 6 shows a schematic layout for a theoretical Forge Shop of Tomorrow.

References

[1] W. G. Patton, Automated Forging Line Boosts Output, Cuts Costs, The Iron Age, Oct. 2, 1952, p. 93.

[2] L. J. Stanbery and J. M. Brennan, Rapid Billet Heating With Gas, The Iron Age, Aug. 26, 1948, p. 82.

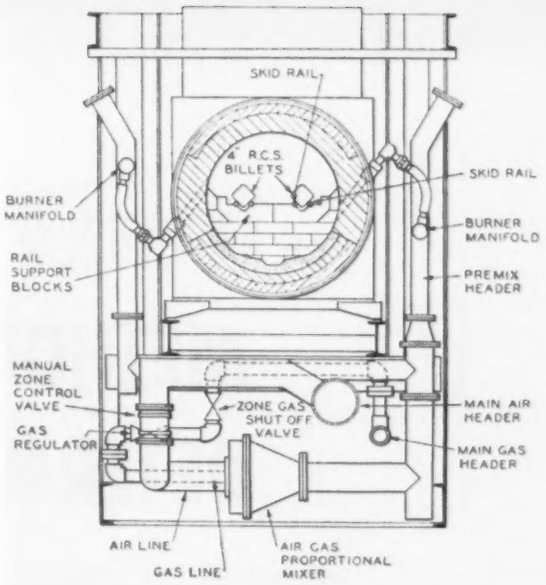

FIG. 4—Cross section through width of typical high speed barrel type furnace used in automated forging setup.

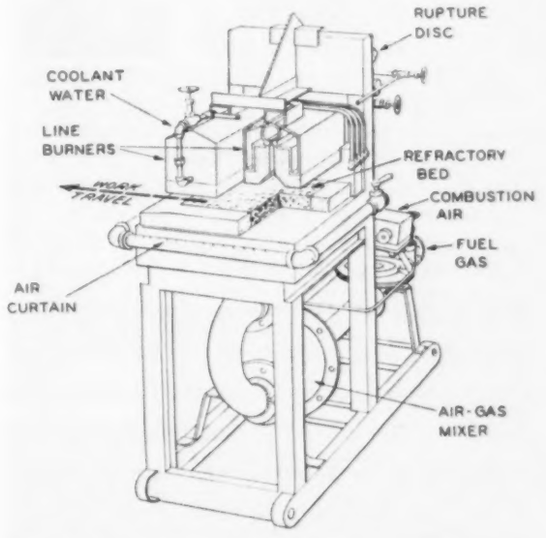

FIG. 5—Cutaway view of slot type high speed heater with water cooled line burners and impact refractory bed.

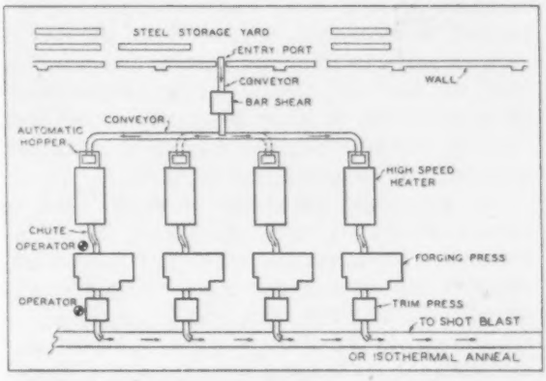

FIG. 6—Layout for "Forge Shop of Tomorrow." Entire operais automatically controlled, actuated.

Check your ratio delay—

P CHARTS improve METHODS FOR DETERMINING DOWNTIME

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If you use ratio-delay techniques for establishing downtime percentages, you can get more accurate results with this simple method. The p chart, long a handy quality control tool, has been adapted for use with ratio-delay techniques. Result is an improved statistical method for determining downtime, and more accurate data for use in development and application of incentive plans.

Application of an incentive plan to a job or group of jobs can usually be reduced to a formula, if time study allowances can be accurately determined. All the usual allowances such as personal time or incentive are generally empirical with the exception of the percent downtime, which can be more accurately determined. Finding this downtime for a group of machines, however, can become a real headache.

The ratio-delay technique is widely used to quickly, accurately and economically determine percentage downtime for a group of similar machines using similar materials. Although the technique is derived from statistical bases, its application is relatively simple. Essentially, ratio-delay is the same as p, or fraction defective charts used in statistical quality control. For all parts produced from the *same* combination of man, machine and materials, a certain percentage is defective. If we consider machine *downtime* as being *defective* the same thing holds true. Then, of all the observations made of a man-machine relationship, a certain percentage would be downtime. This percentage is then applied as a downtime allowance in a time study.

An important step in the quality control procedure for a p chart is investigation of data as it is collected. When a fraction defective for all material has been determined, a p chart is constructed showing the limits of variation of the fraction defective of an individual inspection group. These limits distinguish the expected-by-chance fraction defective dispersion of a subgroup from fraction defective in the entire lot. When an inspection group fraction defective falls outside the upper or lower limits, some as-

signable cause is indicated. The next step is to find the cause and isolate it.

This charting procedure has been used advantageously with ratio-delay. Although the p chart can be advantageously used, the authors have found that the chart is not actually constructed in industry as data is being collected. This should be done to check on the basic background of the ratio-delay method. As the following example shows, not making the chart can easily lead to inclusion of information that does not belong in the downtime allowance.

After selecting the group of machines on which the ratio-delay study was to be made, it was necessary to determine the approximate number of observations needed for a satisfactorily accurate downtime figure. To calculate the number of observations required, three assumptions were made which had no bearing on the final results. These, used only for preliminary purposes, were: An estimation of downtime for the group of machines; degree of accuracy desired for the percent downtime; level of confidence required for the degree of accuracy. Downtime was estimated as 10 pct and desired degree of accuracy was 2 pct. It was also decided that 2 pct accuracy of the downtime percentage would be sufficient 95 pct of the time. This was incorporated in the formula: desired accuracy $= 2\sqrt{\frac{p'(1-p')}{N}}$ where p' = estimated downtime and N = required number of observations.

The substitution is shown in the equation $0.0_{-} = 2\sqrt{\frac{0.10\ (0.90)}{N}}$. Solving for N, 900 was found to be the required number of readings.

Recording observations followed the normal ratio-delay procedure of taking readings at random intervals during the day. Rest periods and lunch hour were excluded. The remainder of the time, the observer was in the plant as often as possible. Code numbers were assigned to all the possible conditions in which the equipment might be found. As random observations took place, the code numbers were noted. All other precautions were exercised as noted in other treatises on ratio-delay.

After about half of the time thought necessary for the complete study had elapsed, the chart for fraction-defective was started. Downtime observations were totaled. Dividing the downtime observations by total observations gave an estimate of the fraction downtime or $\bar{p}$. This value, $\bar{p} = 0.161$, was substituted in the formula,

$$\bar{p} \pm 3\sqrt{\frac{\bar{p}\ (1-\bar{p})}{N}}$$

The formula gives the upper and lower control limits for the p chart. Upper and lower control limits were found for each week, using the $\bar{p}$ calculated before, when the proper total number of observations for that week was substituted for N. The calculations of the upper and lower control limits for each week are given

Can YOU Use Ratio-Delay?

Ratio-Delay is a statistical technique for determining what portions of machine delays are avoidable and what are unavoidable.

Advantages of Ratio-Delay

Observer's work may be interrupted any time without affecting the study. Taking study is not tedious for the observer.

Operators do not object to ratio-delay studies since no stop watch is used and operators are not under long observation.

Cost of ratio-delay study is much less than that of production or all day time studies.

More representative period of time is covered by ratio-delay as compared to all daytime studies.

More accurate delay allowance possible.

Points out areas where work simplification can be applied.

Responsibilities of staff functions, such as maintenance, stockroom are more apparent.

Provides facts, instead of opinions, about delays and irregular occurrences.

How Ratio-Delay Works

Observations at random intervals of time during days and weeks are taken on a machine's status—running or idle.

There must be enough time between observations to give independent readings.

If enough observations are taken, the percentage number of readings which show a machine idle tends to equal the percentage time the machine is actually idle.

Should be applied only to operators doing similar work or to a machine or group of machines doing similar operations. Observations on the machines of a group should be in random order.

Data are more reliable if readings are taken over a long period of time. A thousand readings give fairly accurate results. Over 3000 readings give very accurate results. But accuracy without p-charts can not be stated because of possible observation errors.

As the percentage of delay time increases, more observations are needed for a given accuracy.

"Interest was centered on unavoidable stoppages which are inherent in a production run . . ."

in Table I. The p chart for these first weeks, Fig. 1, shows the individual values of fraction downtime, plotted with the $\bar{p}$ as a center line and the control limits drawn on either side of the center line.

Each week's fraction downtime was found by dividing the observations of downtime for the week by the total number of observations for the week. Although the actual $\bar{p}$ obtained is now the same as the original estimate p', none of the above or following calculations are affected.

The chart, Fig. 1, showed immediately that weeks 2, 8 and 9 produced fraction downtimes outside the control limits. The natural questions asked were, "What was the cause of these points being beyond limits?" and "Could anything be done to correct that cause?"

Legitimate machine stoppages

A check of the records and reasons for recording downtime, showed some of the values included in the total observations and some values recorded as downtime included legitimate machine stoppage for which a man was paid separately. For example, makeready and roll change, separately paid for, were included in the total observations; and such separately paid categories as breakdowns, proof check, run proof, wait for instructions, etc., were also included as downtime.

In determining the percent downtime allowance to use in establishing the time study rate, interest was centered mainly in those unavoidable stoppages which are an inherent part of an actual production run. Some unavoidable situations encountered were bad plates, mechanical trouble, trouble with material, waiting for material, machine adjustment, etc. The ratio-delay being conducted was confined purely to the run or production phase of this operation on the bank of machines.

When a group of complicated machines are run on incentive, establishment of separate legitimate downtime interruptions must be made for the rate to work fairly. Recognition of those that are paid for separately and those that are included in the time study rate are sometimes difficult to judge. This difficulty was clearly demonstrated by the control chart procedure. Reviewing the figures indicated that there were many such occurrences where the stoppage was remunerated separately. A check on the daily work cards confirmed this.

After eliminating those observations which were clearly paid for separately from the downtime observations and the total number of observations and then recalculating the p and control limits, it was found that the basic information concerning the upper and lower control limits was that presented in Table II and the control chart was that in Fig. 2.

Fig. 2 shows the points are now in control indicating that the variations of the fraction downtime are that which can be normally expected by chance causes alone. After gathering more than the earlier indicated 900 readings* a control chart was made for the complete information recalculating p and checking all the data, Table III, for control. This chart is shown in Fig. 3 for the complete study data.

After the delay-ratio of 14.3 pct was found the degree of accuracy of the final study was calculated. Accuracy is shown by the formula desired accuracy $= 2\sqrt{\frac{p'(1-p')}{N}}$, where the

* Other ratio delay studies were being made simultaneously, and readings were continued on all jobs throughout the period of observation.

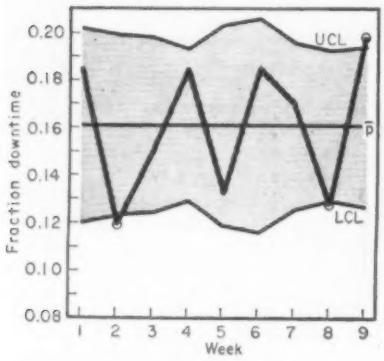

FIG. 1—Fraction downtime outside the control limits show up in weeks 2, 8 and 9, indicate need for further check.

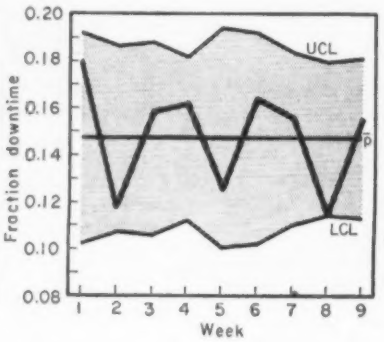

FIG. 2—Plot within control limits resulted when legitimate delays shown in FIG. 1 were removed, times replotted.

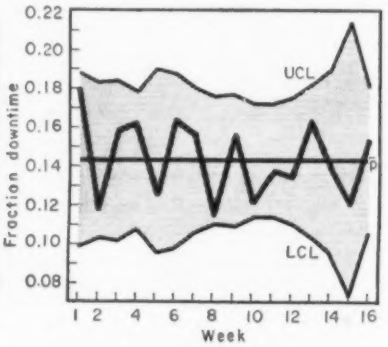

FIG. 3—Final chart for all readings, recalculated, shows plot of delay time to be well within upper and lower limits.

TABLE I

RATIO-DELAY DATA: FIRST NINE WEEKS

Week	No. of Observations N	Downtime Observations c	Fraction Downtime p	$3\frac{\bar{p}(1-\bar{p})}{N}$	Lower Control Limit (LCL)	Upper Control Limit (UCL)
1	81	15	0.185	0.0408	0.120	0.202
2	93	11	0.118	0.0381	0.123	0.199
3	101	15	0.149	0.0386	0.124	0.198
4	135	35	0.185	0.0316	0.129	0.193
5	76	10	0.132	0.0421	0.119	0.203
6	65	12	0.185	0.0455	0.116	0.206
7	112	19	0.170	0.0347	0.126	0.196
8	133	17	0.128	0.0318	0.129	0.193
9	121	24	0.198	0.0334	0.127	0.194
Totals	917	148	$\bar{p}=\frac{148}{917}=0.161$			

actual p of 0.143 was substituted and 1428 was substituted for N. This gave an error of less than 1 pct. This implies that, if another study was made, 95 pct of the time the fraction downtime p would not be greater than ± 1 pct from the present fraction downtime of 0.143.

Ratio-delay technique has been used widely in determining the downtime allowance to be applied to time study.

REFERENCES

J. S. Petro, Using Ratio-Delay Studies to Set Allowances, Factory Management and Maintenance, Oct., 1948.

R. L. Morrow, Time Study and Motion Economy, Ronald Press: New York, 1946.

L. P. Alford and J. R. Bangs, Production Handbook, Ronald Press: New York, 1944.

TABLE II

RATIO-DELAY DATA: FIRST NINE WEEKS*

Week	No. of Observations N	Downtime Observations c	Fraction Downtime p	$3\frac{\bar{p}(1-\bar{p})}{N}$	Lower Control Limit (LCL)	Upper Control Limit (UCL)
1	61	11	0.180	0.0453	0.102	0.192
2	77	9	0.117	0.0404	0.107	0.187
3	76	12	0.158	0.0406	0.106	0.188
4	105	17	0.162	0.0346	0.112	0.182
5	56	7	0.125	0.0473	0.100	0.194
6	61	10	0.164	0.0453	0.102	0.192
7	90	14	0.156	0.0373	0.110	0.184
8	114	13	0.114	0.0332	0.114	0.180
9	109	17	0.156	0.0339	0.113	0.181
Totals	749	110	$\bar{p}=\frac{110}{749}=0.147$			

* Corrected.

TABLE III

COMPLETE RATIO-DELAY DATA

Week	No. of Observations N	Downtime Observations c	Fraction Downtime p	$3\frac{\bar{p}(1-\bar{p})}{N}$	Lower Control Limit (LCL)	Upper Control Limit (UCL)
1	61	11	0.180	0.0453	0.096	0.188
2	77	9	0.117	0.0404	0.103	0.183
3	76	12	0.158	0.0406	0.102	0.184
4	105	17	0.162	0.0346	0.108	0.178
5	56	7	0.125	0.0473	0.096	0.190
6	61	10	0.164	0.0453	0.096	0.188
7	90	14	0.156	0.0373	0.106	0.180
8	114	13	0.114	0.0332	0.110	0.176
9	109	17	0.156	0.0339	0.106	0.177
10	149	18	0.121	0.0290	0.114	0.172
11	145	20	0.138	0.0295	0.114	0.172
12	126	17	0.135	0.0316	0.111	0.175
13	85	14	0.164	0.0385	0.104	0.182
14	58	8	0.138	0.0466	0.096	0.190
15	25	3	0.120	0.0710	0.072	0.214
16	91	14	0.154	0.0372	0.106	0.180
Totals	1428	204	$\bar{p}=\frac{204}{1428}=0.143$			

NEW BOOKS

"Die-Casting," by C. O. Herb. In the second edition of a text which has already gained recognition, Mr. Herb brings his data up-to-date and to a new completeness. Discussion of methods, machinery, alloys and die design make up the backbone of the book. The Industrial Press, 148 Lafayette St., New York 13. $4.50. 310 p.

"Gmelins Handbuch Der Anorganischen Chemie. System No. 41 Titan (Titanium)." Entire pertinent world literature on titanium is systematically arranged and reviewed. Geology, geochemistry, metallurgy, physics, technology, and alloys are covered. (In German.) Walter J. Johnson, Inc., 125 East 23 St., New York 10. $27.50. 481 p.

"Gmelins Handbuch Der Anorganischen Chemie, System No. 3 Sauerstoff (Oxygen), Part 2." (In German.) Covers the distribution of oxygen, physical and chemical properties and behavior. A special section deals with oxygen isotopes. Technology of manufacture is treated in detail. A handbook of the pertinent literature on the subject. Walter J. Johnson, Inc., 125 East 23 St., New York 10. $15.48. 218 p.

"Yankee Iron." Some time ago an unusual book came across this desk telling the story of a company—Eastern Malleable Iron Co. Imaginative overall, and lush in spots, it tells the dramatic and moving story of the development and life of a foundry business. Inset in the cover is a sample of the company product, a "Yankee Iron" casting. Eastern Malleable Iron Co., Naugatuck, Conn. 140 p.

"101 New Uses For Porcelain Enamel." Comprehensive listing of feasible applications of porcelain enamel. Possible products range from hog feeders to ship bulkheads. Porcelain Enamel Institute, 1010 Vermont Ave., N.W., Washington 5, D. C. $6.00.

"A Manual On Underground Corrosion." A roundup of latest information on corrosion causes and corrective measures, illustrated with line drawings. Starts with an explanation of the Galvanic cell and is written so the layman can understand the subject. Columbia Gas System Corp., 79 North Third St., Columbus 15, Ohio. 75¢. 37 p.

Harder hammer heads—

CARBIDE TIPPED HAMMERS cut pulverizing costs

By W. E. Fawcett
Engineer
Kennametal, Inc.
Latrobe, Pa.

Hammers of pulverizing mills last up to 100 times longer when tipped with tungsten carbide. In one coke crushing installation where special steel hammers milled one carload, carbide tipped hammers milled 80 carloads. Similar results have been obtained in milling foundry sand. Overall hammer length, essential to mill efficiency, is maintained for longer periods. K grades of tungsten carbide have been developed with high impact strength. Costs for replacement of hammers have been reduced while maintenance downtime has been minimized.

While the advantages of cemented tungsten carbides for metal working operations are well known, a comparatively new field is their use in pulverizer and shredding applications.

Alloy steel hardness runs 10 to 15 Rc points below the wear resistant grades of tungsten carbide. These grades of carbide K1, K6 and K8 have a hardness of Rc 76, 80, and 81 respectively compared to steel with a maximum hardness of about Rc 66. The individual tungsten carbide particles are between sapphire and diamond in the scratch hardness test.

The wear surface is almost entirely made up of these extremely hard particles, providing good resistance to abrasive action. Fig. 1 shows a typical metallurgical structure. Uniformly distributed grains of various sizes up to a few micro inches in length provide strength, and virtually complete freedom from porosity. This excellent structure accounts, in a large measure, for the outstanding wear resistance tungsten carbides display. Comparative life up to 100 times that of steel has been achieved in some cases.

Normally an exceptionally hard material such as tungsten carbide would have a very low impact strength. Continued research has developed grades with surprisingly high impact strength. A comparison of K6 with SAE 4045 steel will help to visualize this high impact strength. A single blow on a ½-in. square specimen of K6 shows an impact strength in the vicinity of 9.5 ft lb. Impact strength of SAE 4045 steel at 174 Bhn may run as low as 5 ft lb. The softer the tungsten carbide grade, the more shock resistant it proves to be.

High impact strength of some grades of cemented carbide is demonstrated by its use in interrupted cutting with single-point tools, and percussive applications such as rock bits, mortars and pestles, and hammer applications for pulverizing.

In making lead pencils, pea-sized graphite particles are first pulverized into a very fine powder. A Raymond 18-in. high speed vertical pulverizing mill is used to reduce the graphite. Hammers revolve in a 17½-in. diam circle at 6000 rpm. The

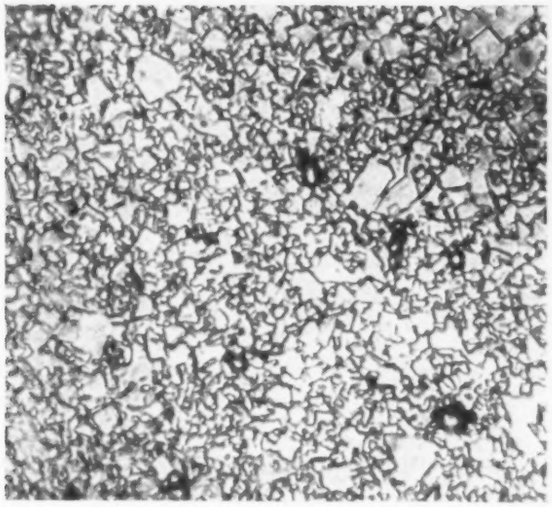

FIG. 1—Metallurgical structure of tungsten carbide. Hard particles, uniform grain distribution provide strength, freedom from porosity. X1500.

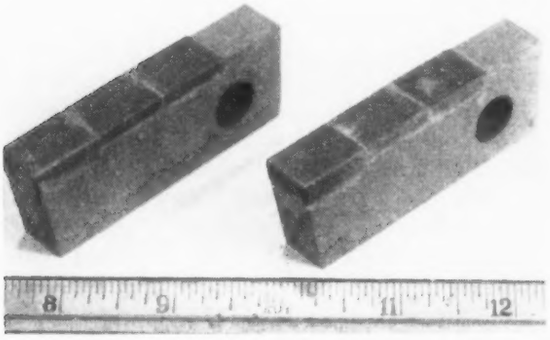

FIG. 2—Hammers of graphite pulverizing mill tipped with K6. Pea-sized particles are ground to fine powder.

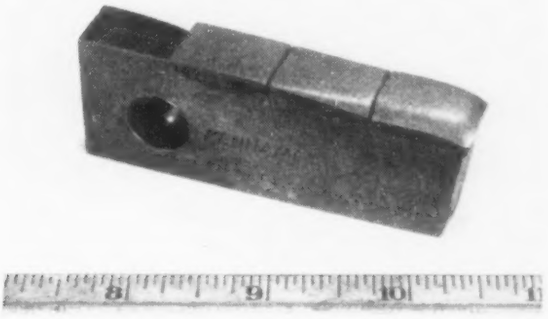

FIG. 3—Pulled from service before full life was obtained, this graphite mill hammer shows signs of wear.

mill is powered with a 25 hp motor and graphite fed in by a screw-type conveyer.

Lump graphite drops onto the hammers which spin horizontally around a vertical axis. Forced air at 800 cfm carries the fine graphite up to a classifying device through which material of finished size passes. Oversized particles drop back down into the hammers for further pulverizing. This fine graphite is carried off through a closed system to hoppers where it is bagged.

Present life of K6 carbide tipped hammers is 500 hr at a cost of $0.011 per hammer per hour of pulverization. This figure far surpasses anything previously tried, including other carbides, Figs. 2 and 3. Carbide tipped hammers have been used in several cases on the Jay Bee Mill for chopping alfalfa and grain. On these mills, a gravity separator removes stones, bolts, and other foreign material.

The mill, Fig. 4, uses 54 hammers per set which swing in a 34-in. diam circle at 3600 rpm. Two tips, each 3/16 x 6/16 x 9/16 in. were applied to the hammer bodies, one tip on each end of the reversible hammers. The hammers are normally used for chopping alfalfa. During off-seasons, however, corn is run through the mill.

Steel hammers formerly used cost $1.24 each. Hammer life was estimated at 200 tons per set. This figures out to a 0.337¢ hammer cost per ton, plus labor and down time for changing hammers every 24 hr during operation. Carbide-tipped hammers consisted of 54 hammer bodies at $1.24 each plus $5.17 for the carbide and the brazing of two K6 tips on each hammer. After 1800 tons were put through the mill its hammers were only partly used on one end. Operational cost at this point totaled 0.192¢ per ton. An estimated 1/3 hammer life has been used. This would amount to an estimated cost of 0.064¢ per ton, without the added savings in downtime realized.

Several chocolate manufacturers use the carbide tipped hammers to pulverize cocoa beans. Hammers on their Raymond mills travel in a 22-in. diam circle at 3600 rpm. Original manganese steel hammers, Fig. 5, lasted about 10 days

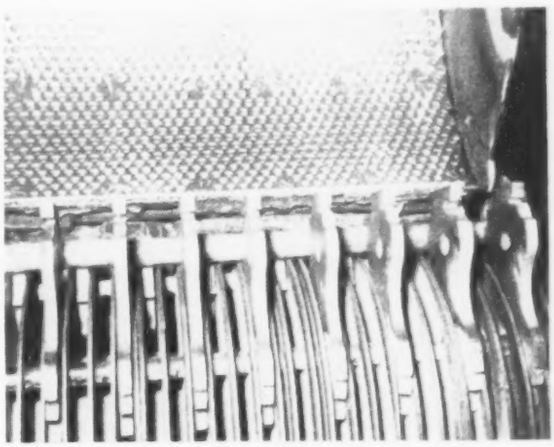

FIG. 4—Setup of carbide-tipped hammers in Jay Bee mill used for chopping alfalfa and corn.

and crushed about 180,000 lb of cocoa beans. Steel hammers were changed frequently since higher efficiency is achieved when hammers are at full length. Greater overall efficiency has been

Carbide tipped hammers used in a coke crushing mill boosted yield per set of hammers from one to 80 carloads . . . With extra wear-proofing output reached 110 carloads per set . . .

FIG. 5—Cast manganese steel hammer after pulverizing about 180,000 lb of cocoa beans.

FIG. 6—Hammer tipped with K6 tungsten carbide was removed after pulverizing 5 million lb of cocoa beans.

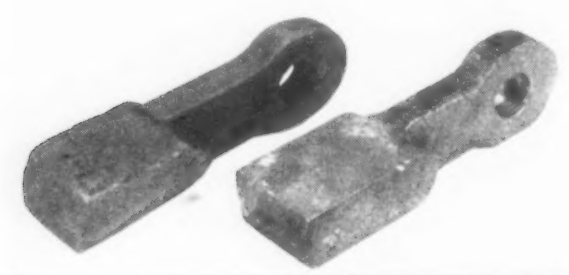

FIG. 7—Forged steel hammer used for crushing coke. Hammer, left, crushed 33 tons. Hammer, right, is unused.

FIG. 8—Eighty carloads of coke were crushed in mill from which this tungsten carbide tipped hammer was taken.

achieved by carbide hammers due to their longer life at full length.

K6 tipped hammers, Fig. 6, operated for 8 months on a 7-day week at 22,000 lb per day, or 5 million lb of pulverized cocoa bean. An increased life of 28 times over steel hammers was noted. This application showed an estimated savings for 1 yr of $3007.

A steel company had previously used special steel hammers for crushing coke to ⅛-in. for sintering. These hammers, 38 to a set, were removed and built up with special hard welding material after crushing 1 carload of 33 tons. Fig. 7.

To minimize hammer changing and maintain production, a set of steel hammers tipped with K12 carbide was tried. These hammers, Fig. 8, crushed 80 carloads, 2640 tons, before steel supporting the carbide tips was worn too much for further operation. To prevent wearing of steel behind the tips, two rows of carbide tips were used on the next set of hammers, Fig. 9. With this additional wear-proofing 110 carloads, or 36,630 tons of coke were crushed before replacement was necessary.

A third set of hammers was installed with three rows of our tips. Inspection after crushing 75 carloads of coke indicated the hammers would be good for well over 200 carloads.

Many other similar applications are being developed. These embrace pulverizing of porcelain in the reclaiming of scrap; pulverizing of coal for use in solid fuel injection systems; breaking up of foundry sand; pulverizing of the less dense stone; and shredding of grain, peanut shells, wood, and sugar cane. Application of tungsten carbide tips to hammer mill hammers, has generally resulted in longer service life, more reliable performance and lower maintenance costs.

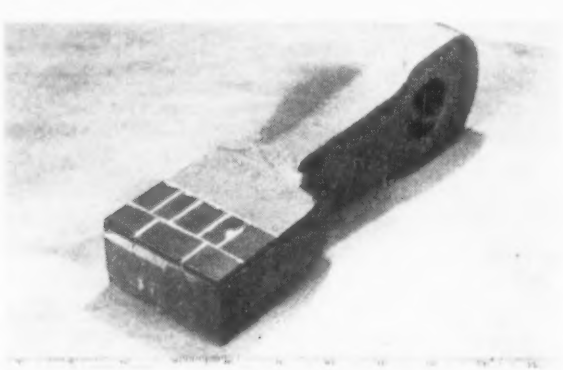

FIG. 9—To prevent wear behind the tips, coke crushing hammers were tipped with tungsten carbide as above.

Fast measurements—

PRECISION INSPECTION

Checks Engine Components Rapidly, Accurately

By Herbert Chase
Consultant
Forest Hills, N. Y.

Air gages play an important part in insuring quick and precise measurements of engine components in Ford's Cleveland plant. In one case, 27 dimensions of a crankshaft are checked in 50 seconds. One man can check dimensions on 800 to 900 camshafts per 8 hr shift with a camshaft multicheck. A special scale weighs connecting rod ends and automatically sets milling cutters for proper metal removal. The latest type of dynamic crankshaft balancing equipment is used.

Production of components for six-cylinder engines in Ford Motor Co.'s new Cleveland plant is accomplished rapidly and with a high degree of precision. Checking and inspection of these components requires proper measuring equipment so that corrections can be made before sizes go outside of specified limits.

Of the numerous types of measuring equipment used in the plant, air gages play an important part in insuring rapid and precise measurements. With air gages measurements are closer than those obtained in ordinary gaging but are

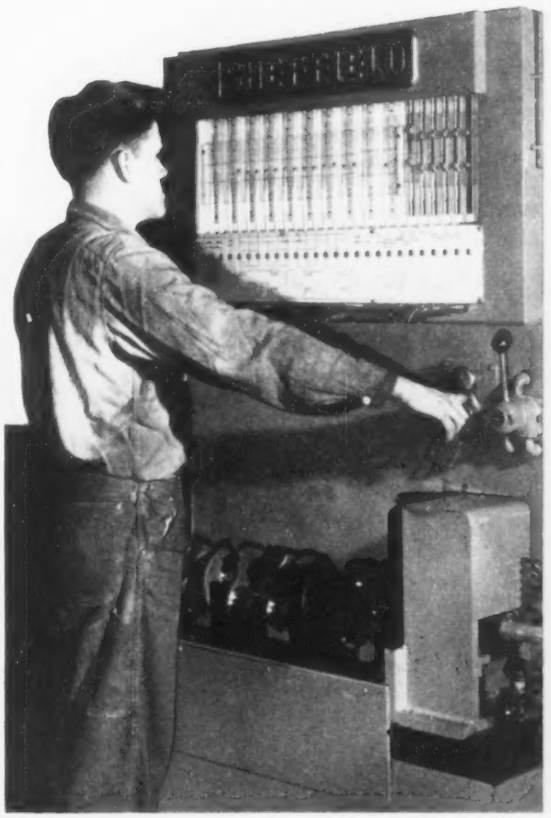

FIG. 1—Final dimensional check of Ford six-cylinder engine crankshafts is made on this machine. Air gages measure 27 critical dimensions.

THE AUTHOR—Mr. Chase, engineer, former trade magazine editor, and author of engineering texts, has been closely associated with industrial developments since 1910.

A complete job of gaging dimensions that must be closely held . . . One gage can indicate 27 critical crankshaft dimensions at once.

so much faster that the time savings justify their greater cost.

In many cases, air gages do a complete job of gaging dimensions that must be closely held. They are so arranged that the position of bobs in glass tubes between lines at specified tolerances show at a glance whether dimensions are within limits. One of the most elaborate of these gages, shown in Fig. 1, shows quickly whether 27 critical dimensions of a crankshaft are within limits, as well as the exact dimension at each point.

The crankshaft is placed in a self-aligning cradle or fixture and turned by hand to determine whether bearing surfaces are out of round. Some dimensions are held within limits 0.0008 in. apart. There are 27 gage tubes. If the air supported bobs do not float between limiting lines on the background scales, the part is rejected. About 50 seconds is required to check the 27 dimensions on the shaft, which is faster and more precise than conventional gaging.

Another air gage, a camshaft multicheck, measures only the four main bearings for diameter and runout, on face for runout and the oil pump gear for pitch diameter. These measurements require only ten gage tubes. One man is able to check 800 to 900 camshafts per 8 hr shift and as skill improves can go as high as 1200 to 1400.

A further camshaft check is made on the Cam Probograph shown in Fig. 2. This highly accurate production instrument supports the camshaft between centers to measure and record cam lobe profile deviations, eccentricities, angular alignments, and also automatically computes and records cam lobe profiles corrected for eccentricity. Since this check takes about 2 hr per camshaft, samples are taken from various cam grinding machines during all working shifts, affording complete control of the process.

A pot-like air gage is used to check pistons, each of which has to be placed by hand into a fixture, as seen in Fig. 3. When in place, air gage plugs enter both ends of the hole. Readings are then made on a four-tube multi-column gage that indicates two piston diameters at two locations for tapered OD as well as the ID of the pin hole at each end.

Graded in steps of 0.0001 in.

After readings of the pinhole ID are taken, the pistons are graded for selective fits of pins that differ in steps of only 0.0001 in. Pistons are then fed along tracks in a rack, each track being for pistons having one of three different selected hole diameters. At the end of the rack, pistons are fitted with pins of corresponding sizes.

The weight of each end of connecting rods is determined on a special scale shown at the right in Fig. 4. Weight at each end of the connecting rods must be within 2 grams of specifications. Since the weight of both ends always exceeds the maximum allowable limit, they must be milled to bring them within limits To prevent error and delay, the weighing scale is provided with an electronic device which automatically sets two milling cutters to remove the correct amount of metal at each end.

After the rod is weighed it is placed in the

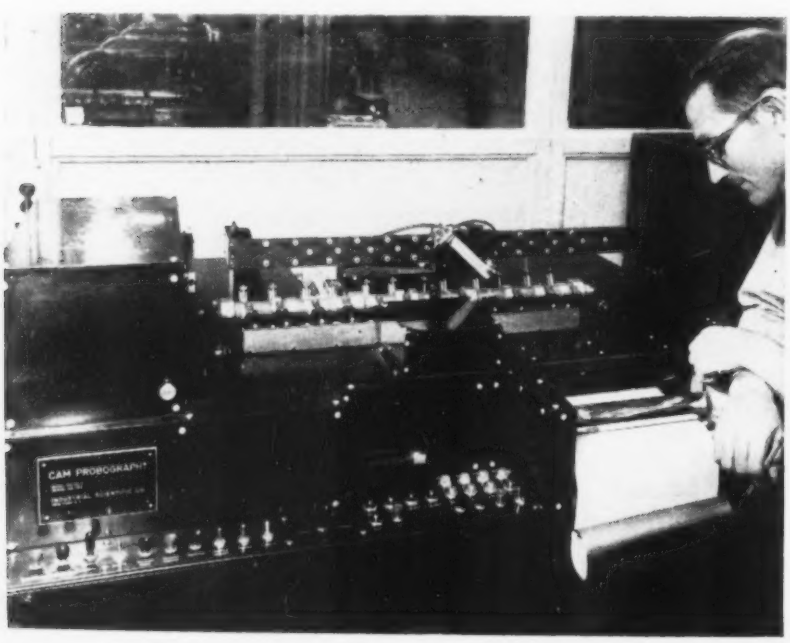

FIG. 2 — With Cam Probograph measurements are made on cam lobe contour, runout and heel diameter. A graphical record of any deviations from standard is made.

milling fixture and the cutters are started. No hand setting is required. While one rod is being milled, the next one is being weighed and setting for the cutters computed according to the amount of correction needed. No re-weighing after milling is required. About 7000 rods per 8 hr shift are weighed and milled in this setup.

Dimensional checks of connecting rods are made mostly by multi-column air gages. One of these has a "nut cracker" fixture that employs a toggle arrangement to clamp the side faces of the crank end against a base, the rod first being set over a gage pin projecting up from the base.

The ID of the hole is measured at two points as a check on taper, and any lack of soundness is determined by swinging the rod through a 90 deg. angle while in the fixture. At the same time width between end faces is measured and any deviation from the squareness of these faces with the bore is determined. Measurements are indicated by the position of the bobs within the gage tubes.

Checked for parallel

Another air gage checks the relationship of the crank end pin bearing hole to the piston hole. Measurements are made to find out if the axes of the two holes are parallel, which they won't be if the rod is bent or twisted. Center to center distance of the two holes is also measured.

When the diameters of crank end and piston pin holes of rods are measured, the rods are classified as to hole sizes. This is done so that piston pins of correct size can be chosen and so that the crank end will be applied to a crankpin that it fits properly.

Dynamic balancing of the six-cylinder crankshafts is done in the latest type of balancer, one of which appears in Fig. 5. These machines not only determine the amount and location of unbalance but are equipped with instruments that indicate where and in what angular position weight must be removed to bring the shaft into balance. Drill heads, with $\frac{1}{2}$ in. and 1 in. drills, are mounted on the machine and remove metal at specified points on the integrally cast counterweight or on the cheeks of the crankshaft.

Due to the length of the shafts, they are balanced one half at a time. On both halves the procedure is the same. The shaft is revolved and unbalance is recorded. The shaft is stopped and the operator sets it at the indicated angle. Drills are fed automatically to the required depth for proper amount of metal removal. When drilling is completed the correct dynamic balance is attained.

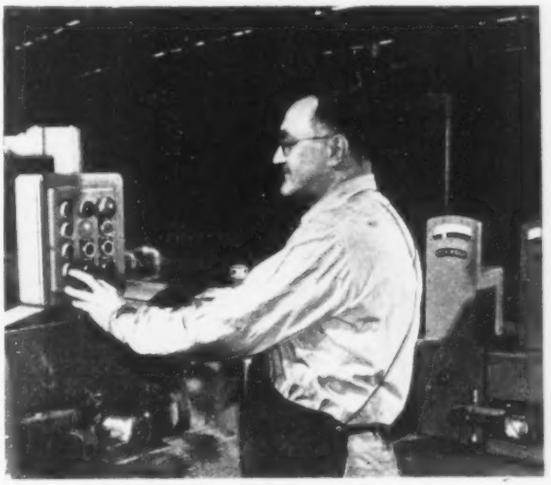

FIG. 4—Weights of each end of connecting rod are checked by precise scale, at right, which automatically sets milling cutters to correct depth.

FIG. 3—Pot-type gage in combination with air gages measures piston OD and taper as well as ID of piston hole. Pistons are graded as to pin hole size.

FIG. 5—Instrument readings on balancing machine automatically provide for correct metal removal, using drills mounted on the machine.

Pointers on springs—

AUTOMATIC BAR POINTER IMPROVES SPRING PRODUCTION

By W. G. Patton
Asst. Technical Editor

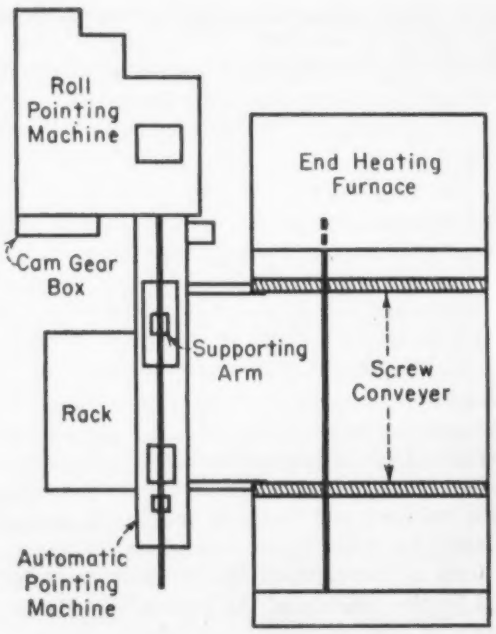

FIG. 1—Plan view of automatic end pointing setup used at Chrysler in front spring production.

Addition of a comparatively simple mechanical bar handling and roll feeding device has increased production and cut rejects of pointed steel bars used for front suspension coil springs in Chrysler-made cars. In addition to providing relief from a monotonous, fatiguing job, the device has improved quality control on the job. A big gain in output per sq ft of floor space was possible.

Front coil springs for Chrysler-built cars range in size from 0.654 in. to 0.519 in. diam. Bars varying from 127 in. to 154 in. in length are used for the coil springs for each line of cars and body type. Spring design varies according to the weight, length and other features of the vehicle.

In addition to holding the height of the coiled spring within specification limits, load specifications also apply. For example, coil springs must be held within ±37 lb at a definite working height.

Close production control is essential, particularly since the point of the spring is an important factor in determining its length. Flatness of the point must also be closely held.

Meeting these exacting requirements, as well as the need for increased production, first drew the attention of Dodge management to the desirability of automatic feeding of an Ajax roll pointer. Details of the machine were worked out by Dodge engineers cooperating with equipment suppliers.

The previous method used at Dodge for pointing steel bars for springs—and which is being continued until additional new equipment becomes available—involves the usual bar end heating in a slot-type furnace. The end-heated bars are moved manually to standard pointing rolls. The bars are then inserted alternately in the rolls and in the squeeze dies. Three roll-and-squeeze passes are required for each bar.

While highly skilled operators turn out a good product, it was evident when top output was needed that a lot of muscle was going into a job that could not be humanly controlled within desired close limits while maintaining the necessary production rate. This led to the decision to try automation.

Under the new completely automatic bar pointer setup, Fig. 1, production of pointed bars has been increased from 125 to 400 per hr. Output

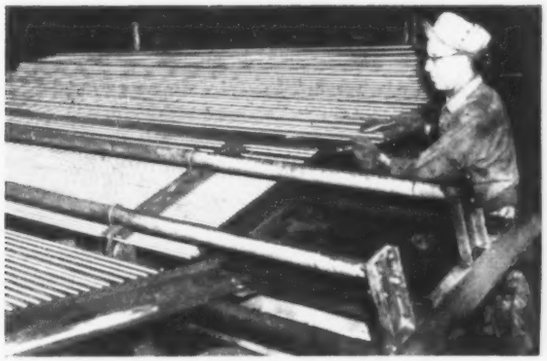

FIG. 2—Bars are loaded into feeder, then automatically conveyed through fast heating furnace.

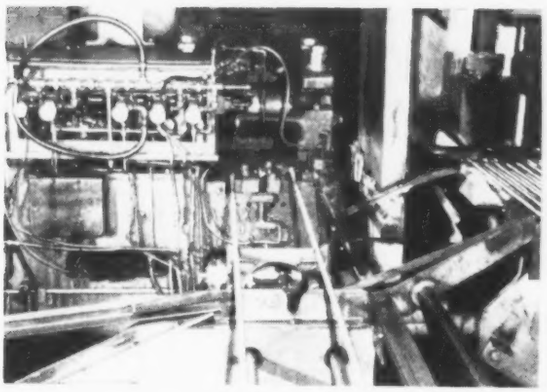

FIG. 3—Front view of pointer setup, showing relative position, halfway through the transfer cycle.

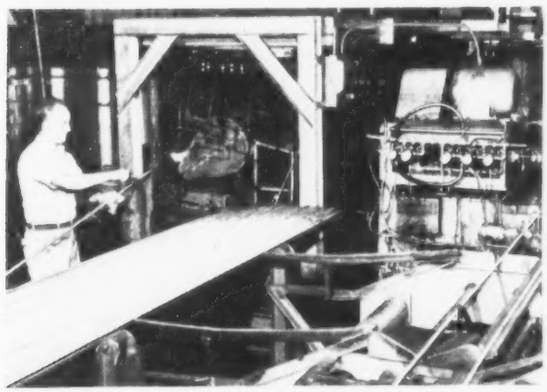

FIG. 4—Overall view shows operator at discharge table checking bars delivered from machine.

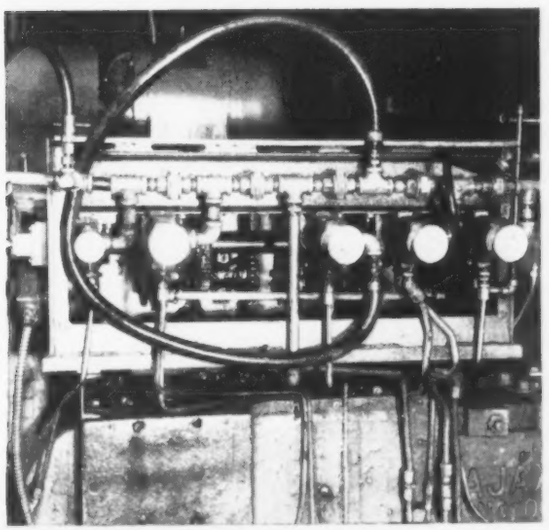

FIG. 5—Closeup of control box used on pointer setup. Air system plays an important part in operation of the control unit.

"Fatigue and drudgery have been eliminated . . . Negligible wear on the automatic setup . . ."

per sq ft of floor space has been increased proportionately and fewer rejects are reported even though production has been greatly increased. Human fatigue and drudgery have been eliminated from a tiresome, wearying job.

Operating experience during the past year shows there is negligible wear on the automatic setup. Downtime for adjustments and repairs has been held to a minimum. Air valves and other actuating and timing devices are flexible and have proved reliable in service.

Another advantage of the installation is that automatic equipment can be operated three shifts. A long operator training period is not needed.

Only one end of the bar — about 12 in. — is heated in the Surface Combustion slot-type furnace. For most springs, Amola steels (when available) or SAE 5160 centerless ground stock is used.

Steps in operation

Detailed steps in the bar-pointer operation are as follows:

1—Approximately a 1-hr supply, 400 bars, are placed on the loading rack, Fig. 2. Bars feed by gravity against a stop. Cam-operated pins located at three points along the storage rack move up simultaneously, pushing the bar onto a 2-screw conveyer which feeds the slot-type furnace. These pins also prevent movement of a second bar onto the furnace feed until the proper time. There are several stops and guides to control movement of the bars through the furnace.

2—Worm screws feeding the furnace are driven by a Reeves variable speed device. The highspeed gas furnace is equipped with water cooling and other standard features.

Movement of the bars through the furnace is synchronized with the turning of the rolls. The worm drive moves the bars through the heating furnace at a rate dependent on the production rate.

3—At the proper time, the worm drive releases the bar into a gravity-fed V-type holder. The holder is lined with wood at the cold end to minimize shock and eliminate vibration of the dropping bar. Simultaneously, an air-actuated length gage moves out and pushes the bar into position for feeding the rolls. No end gage stop is used in the rolls.

4—A double arm crank simultaneously picks up the heated bar and places the finished bar on a table. The heated bar is held in back of the hot end by a steel finger-type gripper mounted on a steel arm, Fig. 3.

Timing of the opening and closing of the fingers and forward and backward movement of the arm is cam-controlled by a chain timer synchronized with the turning of the rolls. A pulley mounted on the rear arm, also supports the bar.

Height of the bar above the floor is determined by the amount the arm is moved forward or backward. Each bar moves through 180° during the process of being transferred from the loading station. The bar moves forward a distance of approximately 18 in. at the start of the cycle.

5—In front of the opening between the squeezing dies is a steady rest. This is in top position during each of the first two strokes.

6—The forging cycle consists of three strokes. On each stroke an alternate rolling and squeezing takes place. With each stroke, the bar moves forward for rolling, retracts for squeezing. This cycle is repeated twice. On the third stroke, the steady rest position is lowered about $\frac{3}{4}$ in. to permit the bar to reach the lowest position in the die. In this position, identifying parts numbers are stamped on the narrow, flat side of the pointed bar.

7—The combined load-pickup device removes the pointed bar and simultaneously loads a freshly heated bar into the machine. Pointed bars are transferred to a discharge table, Fig. 4.

Ability of the automatic machine to keep pointed bars flat and uniformly square was an important consideration in adopting the new forming method. In the Dodge spring pointing operation, width and thicknes of the pointed bar is held within 0.015 in. and 0.005 in. respectively.

Peened with cut wire shot

Following the pointing operation, bars are conveyed through a bar heating furnace, coiled and oil quenched and drawn and, finally, shot peened with cut wire shot.

Since consistently high quality of the finished coil spring is largely dependent on the accuracy and control of the initial pointing operation, the uniform results obtained from this new automatic high production pointing operation are most desirable.

The cam gear box which controls the sequence of operations of the bar pointing machine is shown in Fig. 5. Cam gears are operated directly off a jack shaft by a roller chain connected to the main roll. Shown in the photograph are five Air Saver valves which work directly off the cam.

The air system operates at a pressure of 60 psi. The air system at Dodge operates at approximately 100 psi. A reduction valve is required to reduce the operating pressure to the desired level. A surge tank is included in the system to make certain an adequate volume of air will be available at all times.

Several of the valves in the cam box, Fig. 5, operate more than one valve in the air system. At several points in the system, flow control valves are used to provide the fine adjustment necessary to insure fast and accurate control.

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Technical Briefs

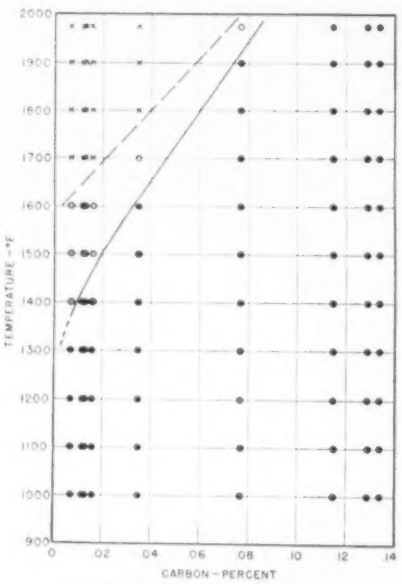
Engineering

AUSTENITIC STAINLESS:

Solubility of carbon studied by NBS . . . Lower values reported.

Austenitic stainless steels, with distinctive crystal structure combine superior resistance to corrosion with ease of working. Properties and applications of these steels are considerably affected by the amount and form of carbon they contain.

A study of solubility of carbon in austenitic stainless steel containing 18 pct Cr and 10 pct Ni was recently conducted on AISI types 302 and 304 stainless steels at request of the Navy Bureau of Aeronautics.



SOLUBILITY of carbon in high purity austenitic stainless of 18 pct Cr, 10 pct Ni.

Carbon Content—With a carbon content of 0.007 pct, lowest content studied, solution was substantially complete between 1300° and 1400° F. Solubility appeared to increase approximately linearly from about 1400° to 1975° F, the maximum temperature studied, where carbon solubility was approximately 0.08 pct.

These values of solubility are appreciably lower than previously reported. The solubility curve developed at NBS indicates that type 304 ELC (extra low carbon) stainless steel can be effectively annealed at 1700°F, but that ordinary type 304 stainless should be annealed at temperatures in excess of 1900°F if the carbon is to be fully dissolved.

Limitations — The NBS study also points up limitations on the effectiveness of attempts to eliminate intergranular embrittlement of austenitic 18 pct Cr-10 pct Ni steel by reducing carbon content.

Annealing of austenitic stainless steels is often governed by the desire to obtain a completely austenitic structure—that is, a structure in which all carbon is in solution in gamma iron.

Annealing temperatures usually range between 1950° to 2000°F.

Annealing at lower temperatures, however, results in smaller grain size, which is thought to reduce susceptibility to intergranular embrittlement. Since the temperature at which all carbon is in solution increases with carbon content, it seems to follow that low-carbon steels may be annealed at lower temperatures than the higher-carbon varieties.

IF YOU WANT MORE DATA

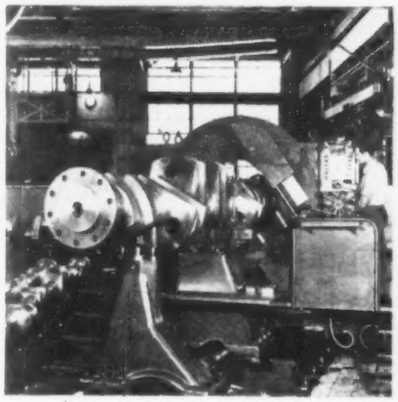
You may secure additional information on any item briefed in this section by using the reply card on page 69. Just indicate the subject heading and the page on which it appears. Be sure to note exactly the information wanted.

SPECIMEN of high purity stainless is placed in electric furnace at National Bureau of Standards during study of carbon solubility in stainless. Rods were held in furnace at 800°F for 6 weeks to precipitate carbon.

CRANKSHAFTS:

Fewer fixtures needed, saving in floorspace reported.

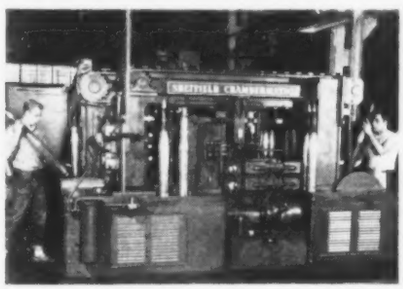
Greater precision in machining 7-ton crankshafts for Cooper-Bessemer Co.'s largest, most powerful engines is possible with this new crankpin turning lathe. Since the head of the Wickes crankpin turning lathe turns while the crankshaft remains stationary,



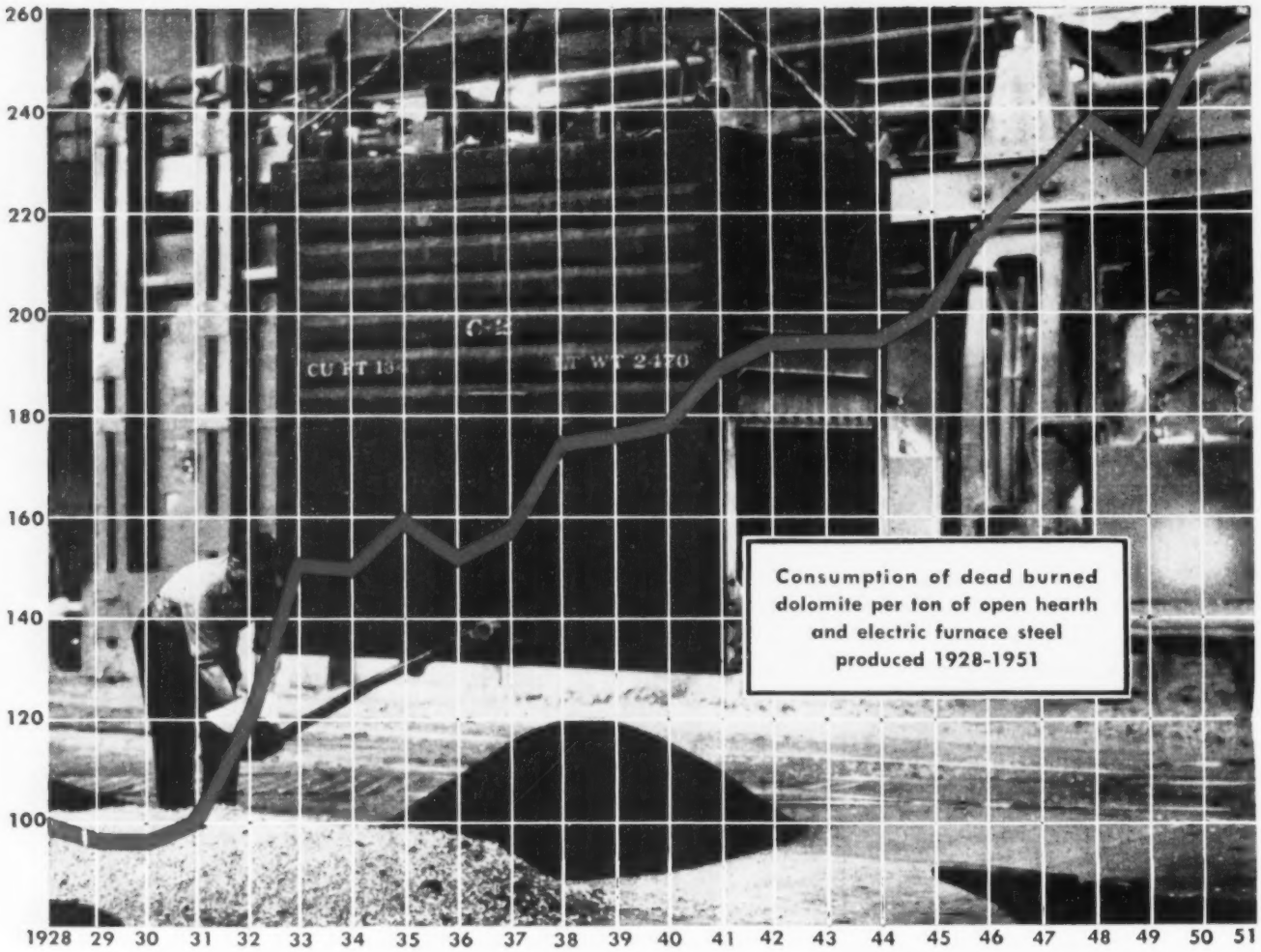
CRANKPIN turning lathe installed at Grove City, Pa., plant of Cooper-Bessemer has helped reduce number of jigs needed for machining big 7-ton crankshaft.

counterweighting the crankshaft is no longer required.

Fewer jigs are needed and less floor space involved in handling the turning operation. A key component for the 5000 hp engine, the crankshaft must be precision assembled to tenths of thousandths accuracy. The big lathe is installed at Cooper-Bessemer's engine building plant located at Grove City, Pa.



LOADED shells are checked for size to assure correct gun chamber fit in this big gaging unit developed by Sheffield Corp. in cooperation with Picatinny Arsenal. Unit is reported to be one of the largest gaging units ever built.



calcined dolomite vs. dead burned dolomite

THE price of calcined dolomite approaches that of dead burned dolomite. But in terms of effectiveness as a hearth refractory, calcined dolomite has most of the shortcomings of raw dolomite. However, it lacks the effectiveness of this low priced material for routine drying of bottom.

Calcined dolomite is often called "single burned", just as dead burned dolomite is referred to as "double burned". This outdated nomenclature originated years ago when raw dolomite was first calcined (fired to a temperature high enough to drive off CO_2) and then refired at higher temperatures to obtain dense, thoroughly shrunk granules containing essentially crystalline magnesia and lime.

Calcined dolomite, with a density of 60 to 80 pounds as opposed to 120 pounds per cubic foot for dead burned dolomite, has a high porosity. It reacts rapidly with atmospheric moisture and carbon dioxide. Thus, slaking in transit and storage causes excessive fines. Fines not only pose a dust problem for furnace personnel, but when swept through the furnace by combustion gases, result in damage to all refractories, both below and above floor level.

Lacking density and an integral coalescing agent, calcined dolomite is highly vulnerable to attack during the initial stage of the heat. Calcine thus removed increases slag volume. Magnesia from the calcine leads to viscous slags which take manganese and iron oxides into solid solution, rendering them ineffectual in their important role of refining agents.

Today few steel plants use calcined dolomite. Thus, practice proves the reasoning of science—in increasing consumption of dead burned dolomite.

A pioneer in the manufacture of dead burned dolomite, Basic Refractories Incorporated fulfills its responsibility as a supplier of this essential hearth refractory through a continuing program of product research and quality control and by anticipating, through increased and improved production facilities, the ever expanding requirements of the steel industry for Magnefer and Syndolag.

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New Capacity Strengthens Case for Early Decontrol

By end of this year industry's capacity will be about 116 million net tons . . . Total gain this year more than 7,250,000 . . . Could pour 118 million net tons during next year.

Steel companies in the United States are adding more than 7,250,000 net tons of ingot capacity this year, according to a survey just completed by THE IRON AGE. When this is added to their capacity at the beginning of this year (108.6 million tons), year-end capacity will be close to 116 million tons.

Completion of several large additional projects early in 1953 will raise the industry within reaching distance of its 120-million-ton goal established unofficially in early 1951 under the spur of defense requirements, fast tax amortization, and industry confidence in continuing civilian demand for steel.

Electric Gains Fastest—Of the 1952 expansion total, more than 6 million tons is represented by new openhearth capacity. Balance of the new capacity, over 1 million tons, is due to electric furnace expansion.

When final figures for 1952 are in, openhearth capacity will be over 101 million tons, an increase of 6.3 pct over capacity at start of the year, and 11 pct over capacity at Jan. 1, 1951. Electric furnace capacity will be over 9 million tons, up 13.5 pct from start of the year and 24 pct over capacity at Jan. 1, 1951.

Big Gainers—Major new capacities being brought in this year include 1.2 million tons of openhearth expansion at Indiana Harbor Works of Youngstown Sheet & Tube Co.; approximately 900,000 tons by Jones & Laughlin at Pittsburgh and Cleveland; 600,000 tons by U. S. Steel at Fairless Works; approximately 800,000 tons by Bethlehem; 800,000 tons of openhearth and electric furnace capacity by Republic; 504,000 tons of electric furnace capacity by Northwestern Steel & Wire Corp. at Sterling, Ill.; 550,000 tons of openhearth by Lone Star Steel Co., Lone Star, Tex., and 750,000 tons of new openhearth capacity by Inland Steel at Indiana Harbor. Youngstown expansion at Indiana Harbor was offset by scheduled elimination of 330,000 tons of bessemer capacity.

Geographically, over 3 million tons of new 1952 capacity is being brought into production in the Midwest, while over 2.5 million tons is scheduled for the East.

Coming Next Year — Included among capacities to be added early next year will be 1.2 million tons at the new Fairless Works of U. S. Steel in addition to the 600,000 tons scheduled to be added before the end of 1952.

Other early 1953 additions include Pittsburgh Steel, 325,000 tons due to openhearth furnace enlargements; Detroit Steel, Portsmouth Plant, New Boston, O., 750,000 tons, 4 new 250-ton openhearths; Tennessee Coal & Iron Div., Fairfield, Ala., 200,000 tons, openhearth enlargements. National Steel Corp., also will bring in new capacity next year.

Cost Is Staggering—The industry's newest expansion program involves an investment of more than $4.5 billion on the basis of Certificates of Necessity approved by the Defense Production Administration. The certificates cover expansion in steel finishing capacity, coal and coke, ferroalloys and ores, blast furnace capacity, foundries, forges, and lake and river transportation as well as steel melting expansion.

Industry investment in steel works and rolling mills alone will be over $2.5 billion, of which 61.8 pct will be allowed fast tax amortization. Proposed blast furnace construction will involve spending of $651 million, while another $708 million will be spent on iron ore projects. Fast tax write-offs approximate 71.4 pct and 70 pct, respectively.

Decontrol Argument — New capacity, completed and in the offing, is a potent factor in industry arguments for decontrol of steel. A steel industry task force supported its decontrol recommendations with the following market forecast for 1953:

(1) The industry can produce as much as 118.8 million net tons of ingots—if needed.

(2) No more than 14 million tons will be required for military and atomic energy uses, as now planned.

(3) This will leave as much as 104 million tons for all other purposes — one-third more than the estimated 80 million tons which will have been available for nondefense uses during 1952.

An open-end CMP now seems likely in the near future. This would permit mills to sell to customers without tickets after specified lead time had expired. There is a good chance that all controls, except for military and atomic energy priorities, will be lifted by Apr. 1. Directives will probably be kept.

Steelmaking operations this week are scheduled at 106 pct of rated capacity, one point lower than the past several weeks. Unusually high operating rate can be expected for the remainder of the year because expansion has raised actual capacities for above official ratings.

Market Briefs and Bulletins

Expansion—Aluminum Ore Co., Bauxite, Ark., plans to build a new plant to manufacture finished chemical products from alumina processed from bauxite. Cost of building the new facilities is estimated at more than $5 million. Construction schedule has not yet been determined but production from the first unit built will be ticketed for defense industries.

Auto Market—Automakers believe consumer car demand will be strong early in 1953 but some believe the market may ease considerably thereafter. As a result, they want production as high as possible early in 1953. That's why they're exerting such strong pressure on the steel market now.

Capacity Doubled—Installation of three new heat-treating furnaces has more than doubled the capacity of Kropp Forge Co., Chicago. The new furnaces have a rated capacity of more than 4000 lb per hr as compared with the 2000-lb-per-hr rate of the company's older furnaces. Installation of the units was a part of the company's $5 million expansion program started 2 years ago.

OIT Quotas—Office of International Trade will license up to 118,875 short tons of production tinplate for export during first quarter 1953. Of this quantity, 97,500 tons must be used for foreign food packaging and 21,375 tons for petroleum and its products. OIT also set fourth quarter export quotas for corrugated aluminum sheet and scrap at a combined total of 3,800,000 lb. In addition, a special quota of 100,000 lb of aluminum scrap has been set aside for small business consumers in the Caribbean area.

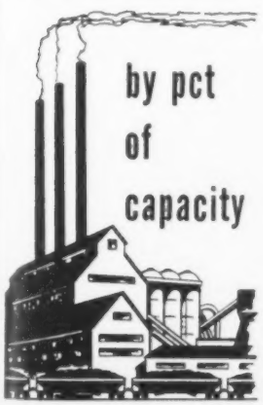
Won't Happen Again—Aircraft industry has been assured there will be no sudden stoppage of military aircraft production when the Air Force goal of 143 wings is reached. Maj. Gen. William H. Tunner, deputy commander of Air Materiel Command, told the National Security Industrial Assn. that the Air Force has definite plans to prevent widespread cancellations of contracts such as followed World War II.

Tubing Allotment—Supplemental allotments of casing and tubing totaling 128,569 tons have been granted to 760 oil and gas operators for the first quarter of 1953. Total tonnage distributed in supplemental allotments is about 47,000 tons greater than was expected when primary authorizations were issued last month. Of the total, allotments amounting to 35,550 tons will be made to operators drilling less than 40 wells a month. Larger operators will get 93,019 tons.

Price Rise—Increases of 3c and 4c per lb of contained chromium are available to producers of ferrochrome, chromium metal, ferrochrome silicon, ferrosilicon chrome, and chrome manganese silicon alloys. Ceiling Price Reg. 180, effective Nov. 25, authorizes ceilings higher than those established under the General Ceiling Price Reg. Increases amount to 3c per lb of contained chromium for high-carbon products and 4c per lb for low-carbon items.

Another Contract — Wilputte Coke Oven Div., Allied Chemical & Die Corp. has been awarded a contract for construction of a battery of 76 by-product coke ovens at Youngstown Sheet & Tube Co.'s Campbell Works, Youngstown, Ohio. The new facilities will have a rated capacity of 450,000 tons per year.

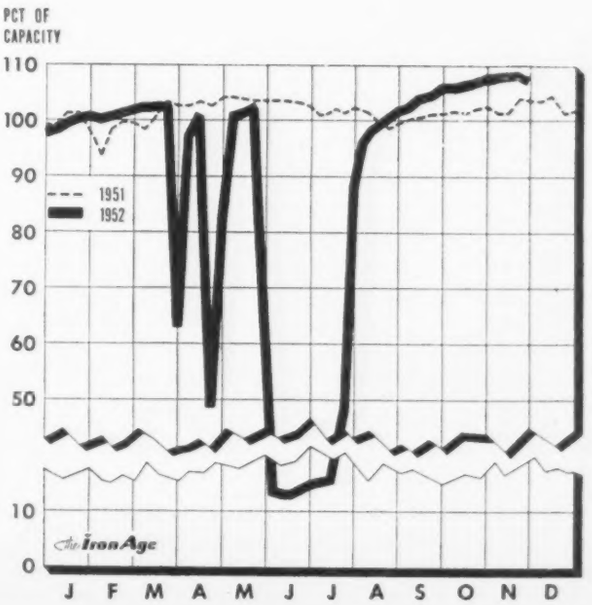
STEEL OPERATIONS



District Operating Rates

District	Week of Nov. 23	Week of Nov. 16
Pittsburgh	107.0	107.0
Chicago	109.5	113.0
Valley	104.0	104.0
Philadelphia	100.0	100.0
West	106.5	111.0*
Buffalo	106.5	106.5
Cleveland	109.0	107.0
Detroit	106.0	106.0
Wheeling	102.0	102.0
Birmingham (South)	107.0	106.5
South Ohio River	93.0	90.0
St. Louis	84.0	86.5
East	95.5	92.5*
Aggregate	106.0	107.0

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised



Lead Price Follows London Dip

No weakness shown in U. S. market but sagging British market drags lead price down . . . Same is likely for zinc when trading resumes about the first of year—*By R. L. Hatschek.*

The London market is still leading U. S. lead prices around by a nose ring. About the time trading in England got to the point where foreign metal could be imported here at about $^3/_4$¢ below the New York price a custom smelter cut back to 14.25¢ per lb at New York and was shortly followed by a producer who reduced the St. Louis price to 14.05¢.

This was the first dip for lead during the month and it certainly wasn't caused by weakness here. True, buying had tapered off a bit, but the market still had an inherent firmness. At the end of the week London prices were even lower, equivalent to a New York price of about 13.20¢. This brought the domestic price down another ¼¢ peg with a custom smelter moving first, a producer following soon after. Both reductions caused similar drops in lead scrap prices. If this trend continues in London it's certain to continue here.

No Zinc Change—Yet—All of the action in lead has caused a slightly weaker tone to prevail in zinc but there have been no price changes—so far. The market continues quiet with the East St. Louis price at 12.50¢ per lb. But what will happen when zinc trading is resumed in London?

The British Ministry of Materials has indicated it won't be as haphazard in disposing of zinc stocks as it was in the case of lead. But it still looks as though London will hook the same nose ring onto zinc prices.

Copper Costs—Office of Price Stabilization has extended current brass mill and copper wire mill ceiling prices to Mar. 1, 1953. Recalculation was made unnecessary by the unchanging nature of the Chilean copper price. The lag is accounted for by the time it takes between purchase and finished product.

In a move applicable principally to manufacturers of copper alloys and copper dust, OPS has authorized producers who use only primary copper in their products to raise prices by 3.84¢ per lb of copper contained. This action covers producers operating under the General Ceiling Price Regulation and excludes producers of copper-clad and copper-coated items governed by Supplementary Reg. 100 to the GCPR.

Motor Makers—Although copper wire mill products are forecast by National Production Authority as continuing very tight in early 1953, the agency expects to hand out enough CMP tickets on copper, aluminum and steel to generator and fractional hp motor manufacturers to permit them to fill orders.

Household appliance demand for small motors is growing. But NPA believes volume will fall off when pipelines and inventories are filled. Meanwhile, supplemental allocations of wire mill products are being prepared for motor and generator manufacturers, enough perhaps to bring fourth quarter volume up to that of the third quarter.

Ingot Shipments—October shipments of brass and bronze ingots totaled 25,811 tons, according to the industry's Defense Council. This compares with 22,770 tons in the previous month and brings the 10-month total to 231,312 tons. Projecting this rate through the rest of the year brings the estimated total to about 282,000 tons, a far cry from the 332,378 tons last year.

Tin Up—Trading in prompt tin on the outside market edged ¼¢ nearer the Reconstruction Finance Corp. price of $1.21½ last week when the quotation rose to $1.21⅜ per lb. This, however, was on the basis of small lots. Meanwhile the London and Singapore markets dipped slightly with the Singapore price finishing the week at a New York equivalent of $1.20 for March delivery.

Rockdale Starts — First aluminum pig was produced at Aluminum Co. of America's new Rockdale, Tex., reduction plant on Monday. When completed the plant's four potlines will have a smelting capacity of 85,000 tons of aluminum annually. Second line is scheduled to start up next month, with the last two being scheduled for completion during the spring.

Power for the first two lines will be supplied by Texas Power & Light Co. but the others will have to wait for completion of Alcoa's own lignite-burning power plant in the fall. At that time all four lines will go on the lignite diet, the first use of this fuel for powering aluminum reduction plants. The new plant will eventually employ between 1100 and 1200 workers with an annual payroll of $4.5 million.

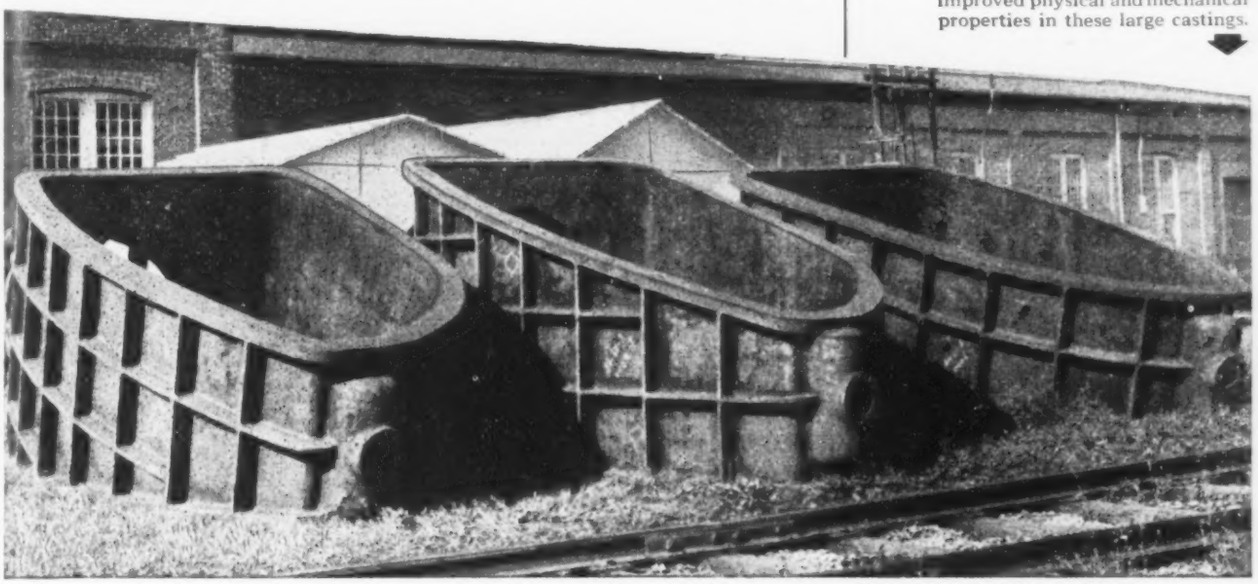
NONFERROUS METAL PRICES

	Nov. 19	Nov. 20	Nov. 21	Nov. 22	Nov. 24	Nov. 25
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.21¼	$1.21¼	$1.21⅜		$1.21⅜	$1.21⅜*
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	14.30	14.05	14.05	14.05	13.80	13.80

Note: Quotations are going prices.
*Tentative.

NICKEL CAST IRON PROVIDES HIGH STRENGTH AND PRESSURE TIGHTNESS...

Water boxes produced of nickel cast iron by Kutztown Foundry & Machine Corp., for Foster Wheeler Corp., to obtain greatly improved physical and mechanical properties in these large castings.



IN CASTINGS OF LARGE DIMENSIONS

Here are three water boxes, weighing 21,500 pounds each, for a power-plant condenser system designed by Foster Wheeler Corporation, New York City.

Excessive pressures of the service involved call for high strength, as well as high density of grain structure.

Accordingly, these water boxes, produced by Kutztown Foundry & Machine Corporation, Kutztown, Pa., were cast in 2% nickel cast iron.

Meeting ASTM "Class 50" specification (minimum 50,000 psi tensile strength) and characterized by dense structure with fine dispersion of graphite throughout, this nickel cast iron provides an extraordinary degree of pressure tightness under hydrostatic pressures.

The matrix of nickel alloyed iron closely resembles the pearlitic matrix found in high-carbon steels. In contrast, the matrix of ordinary plain iron resembles that found in low-carbon steels.

Throughout industry, nickel cast irons spell economy when you need strength, wear resistance and pressure tightness. Write for our suggestions regarding the best nickel alloyed iron for your specific applications.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of engineering nickel cast irons for many end uses in defense and defense supporting industries.

The International Nickel Company, Inc.
Dept. 20, 67 Wall Street, New York 5, N. Y.

Please send me booklet entitled, "Guide to the Selection of Engineering Cast Irons."

Name _____ Title _____

Company _____

Address _____

City _____ State _____

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 31.6¢; 4S, 61S-O, 33.6¢; 52S, 35.8¢; 24S-O, 24S-OAL, 34.5¢; 75S-O, 75S-OAL, 41.9¢; 0.081 in., 2S, 3S, 32.8¢; 4S, 61S-O, 35.2¢; 52S, 37.4¢; 24S-O, 24S-OAL, 35.8¢; 75S-O, 75S-OAL, 43.9¢; 0.032 in., 2S, 3S, 34.5¢; 4S, 61S-O, 39.0¢; 52S, 41.8¢; 24S-O, 24S-OAL, 43.8¢; 75S-O, 75S-OAL, 54.8¢.

Plate ¼ in. and Heavier: 2S-F, 3S-F, 29.7¢; 4S-F, 31.7¢; 53S-F, 33.4¢; 61S-O, 32.5¢; 24S-O, 24S-OAL, 34.0¢; 75S-O, 75S-OAL, 40.7¢.

Extruded Solid Shapes: Shape factors 1 to 5, 35.5¢ to 77.2¢; 12 to 14, 36.2¢ to 93.5¢; 24 to 26, 38.7¢ to $1.22; 36 to 38, 45.9¢ to $1.79.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 39.4¢ to 35.2¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 42.5¢ to 36.8¢.

Screw Machine Stock: Rounds, 11S-Ts, ⅛ to 11/32 in., 56.2¢ to 44.1¢; ⅜ to 1½ in., 43.6¢ to 41.0¢; 1 9/16 to 3 in., 40.4¢ to 37.8¢; 17S-Ts, 1.6¢ per lb lower. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 41.5¢ to 30.5¢; 52S, 50.4¢ to 36.8¢; 56S, 53.6¢ to 44.1¢; 17S-T4, 56.7¢ to 39.4¢; 61S-T4, 50.9¢ to 88.9¢.

Extruded Tubing: Rounds, 63S-T5, OD in in.: 1¼ to 2, 38.9¢ to 56.7¢; 2 to 4, 35.2¢ to 47.8¢; 4 to 6, 35.7¢ to 43.6¢; 6 to 9, 36.2¢ to 45.7¢.

Roofing Sheet: Flat, 0.019 in. x 28 in., per sheet, 72 in., $1.199; 96 in., $1.598; 120 in., $1.997; 144 in., $2.398. 0.24 in. x 28 in., 72 in., $1.448; 96 in., $1.931; 120 in., $2.414; 144 in., $2.897. Coiled sheet: 0.019 in. x 28 in., 29.6¢ per lb; 0.024 in. x 28 in., 28.2¢ per lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, 86; Forgings, 86.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks		53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52		45.12
Copper, h-r		41.37	
Copper, drawn		42.62	
Low brass	42.34	42.03	
Yellow brass	40.17	39.86	
Red brass	43.10	42.79	
Naval brass	44.72	38.78	40.04
Leaded brass			38.02
Com'l bronze	44.39	44.08	
Mang. bronze	48.44	42.82	43.89
Phos. bronze	64.72	64.97	
Muntz metal	42.68	38.25	39.50
Ni silver, 10 pct	51.96	54.18	

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.00
Aluminum pig	19.00
Antimony, American, Laredo, Tex.	34.50
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$2.00
Lead, St. Louis	13.80
Lead, New York	14.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$208 to $210
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	83.25
Tin, New York	$1.21⅜
Titanium, sponge	$5.00
Zinc, East St. Louis	12.50
Zinc, New York	13.33
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 100,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	20.5
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy (0.60 copper max.)	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.34
Electrodeposited	33¾
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball, anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	27½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19⅛	17⅞
Red brass	20¼	19⅜
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅞	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75

Aluminum

Mixed old cast	9 — 9¾
Mixed new clips	10 —11
Mixed turnings, dry	9 — 9½
Pots and pans	8½— 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17 —17½
Light copper	15½—16
New type shell cuttings	15½—16
Auto radiators (unsweated)	14
No. 1 composition	17½—18
No. 1 composition turnings	17 —17½
Unlined red car boxes	16½—17
Cocks and faucets	15 —15½
Mixed heavy yellow brass	11½—12
Old rolled brass	14½—15
Brass pipe	15½—16
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcases	7½
2S aluminum clippings	10½
Old sheet and utensils	7¼
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½

Zinc

New zinc clippings	7 — 7½
Old zinc	5 — 5½
Zinc routings	3 — 3¼
Old die cast scrap	4 — 4½

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

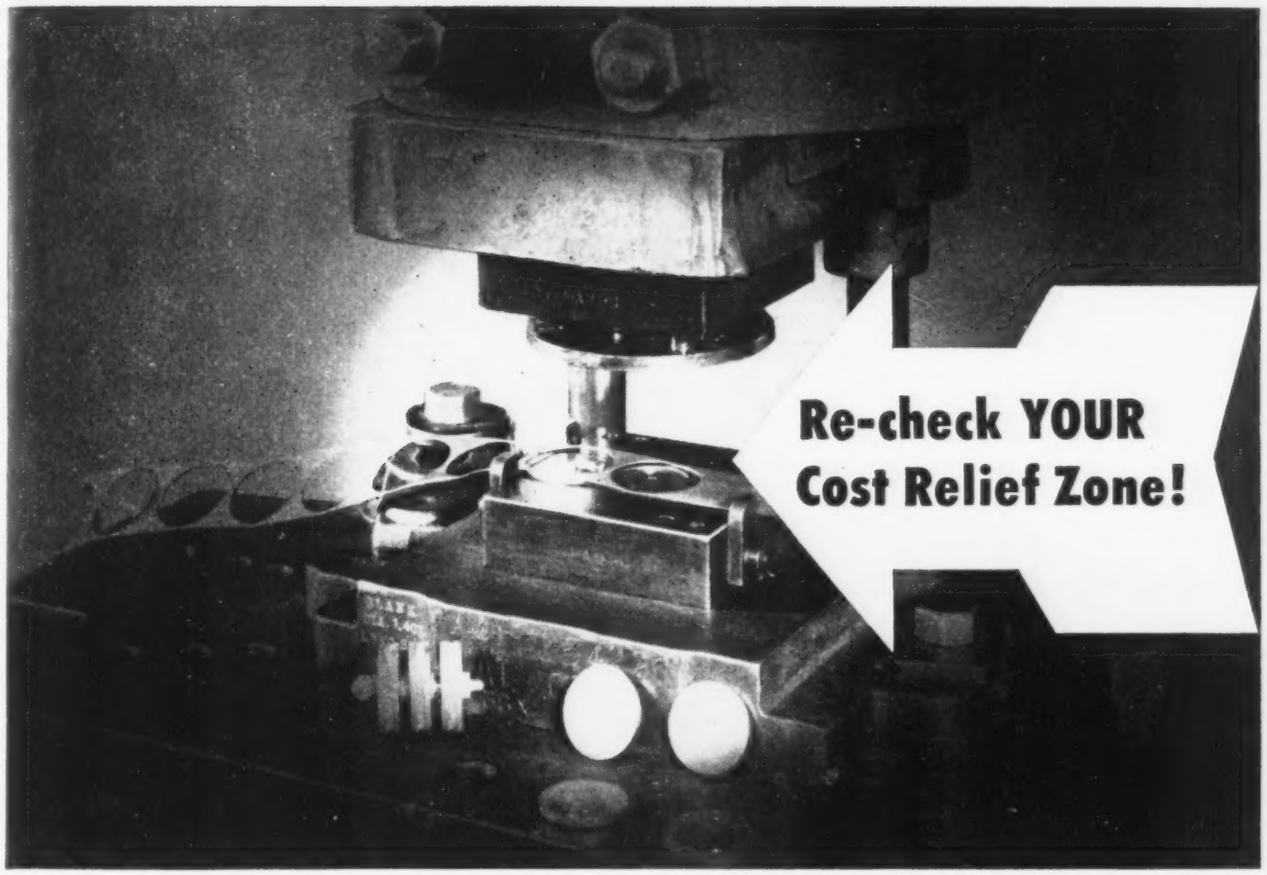
Soft scrap, lead	10¾—11¼
Battery plates (dry)	5.90— 6.15
Batteries, acid free	4.15

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	100
No. 1 pewter	70
No. 1 auto babbitt	55 —60
Mixed common babbitt	13½—14
Solder joints	17¾
Siphon tops	60
Small foundry type	18 —18½
Monotype	13½—14
Linotype and stereotype	12½—13
Electrotype	10¾—11
Hand picked type shells	8¾— 9
Linotype and stereotype dross	5
Electrotype dross	4½



Here's a Challenging Opportunity for Every Man Responsible for Tooling and Production

Your *tools* and *dies* represent an immediate opportunity to bring unit costs down to a reasonable level. A quick re-check of this vital cost zone can result in definite savings. Sometimes these savings show up in less die finishing or adjusting. Or in longer runs with less downtime for regrinding. Many times they come about through a drastic reduction in the *number* of tools and dies you make each year.

Actual job records in plant after plant *prove* these cost economies can be realized. A good example is the job shown above. A re-check of these dies, used to blank and form .008" thick bronze thermostat diaphragms, showed that a different steel with better wearing qualities was needed to reduce excessive downtime for regrinding. This steel, Carpenter Hampden (Oil-Wear), eliminated *11* hours of machine downtime each week and produced over a half-million *extra* diaphragms per grind!

Certainly, if other plants are finding new output and production savings by re-checking their tools and dies, you can too. First step is to use The Carpenter Matched Set Method to select the one steel best suited for your job. By so doing, you back your selection with really dependable Carpenter Matched Tool and Die Steels. Then a call to your nearest Carpenter Mill-Branch Warehouse or Distributor brings fast delivery from stock. THE CARPENTER STEEL COMPANY, 121 W. BERN ST., READING, PA.

Are You Missing These Opportunities In Your Cost Relief Zone?

- Less die finishing and adjusting
- Greater output between grinds
- Fewer heat treating failures
- Less machine downtime

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Carpenter

Matched Tool and Die Steels

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Mill-Branch Warehouses and Distributors in Principal Cities Throughout the U. S. A. and Canada

How Much Scrap Will be Bought in '52?

It's estimated that 30 million gross tons of scrap will be bought this year. Sales loss for trade estimated at about 4.5 million tons . . . No room for inconsistent buying.

Consumers of scrap iron and steel will use an estimated 62,900,000 gross tons of home and purchased scrap this year. The scrap industry will contribute over 30 million tons of this tonnage, on the basis of the traditional ratio of 50 pct home scrap to 50 pct purchased. Last year 68,518,000 tons of purchased and home scrap was consumed.

What accounts for the downtrend is the steelmaking loss of 19 million net tons incurred during the 54-day strike. Another million tons may have been lost because the strike caused some delay in steel expansion. Converted to gross tons this loss is about 17,800,000 tons, of which the scrap industry would have supplied about 4.5 million gross tons.

From very low levels the scrap industry has helped bring mill scrap stockpiles to more than respectable proportions. To meet the steel industry's growing appetite for metallics, the scrap industry has over the past few years invested many millions of dollars in new equipment and expansion. It has spent itself into a position where demand for scrap must remain fairly constant. The scrap industry's machinery cannot be endangered.

Scrap men believe the time is at hand for consumers to regard scrap with the same respect accorded their most precious raw materials. That means purchasing policies must remain consistent. In other words scrap should not be regarded as something that's just there anytime.

In Chicago talk was circulating that steelmaking grades might slip below ceiling prices. But at presstime this had not been confirmed.

Pittsburgh—The market has settled into a year-end lull. Approaching winter appears to be worrying no one. Consumers are satisfied to maintain current ample inventories. At the same time no one is interested in forcing prices down. Despite general mill optimism nothing will be done that might tend to dry up scrap sources.

Chicago — Market here continues slow. Some worry was expressed last week over the probable future of steelmaking grades. At press time this had not been confirmed in sales at below ceiling prices. An offer of $39.50 on No. 1 bundles and No. 1 heavy melting was reported, but was turned down. Freight absorption is now reported on nearly all grades with the exception of openhearth. Brokers indicate that their prices on cast grades are largely nominal, sales in this grade are so few. Sales reported indicated that this market was continuing to sink.

Philadelphia — Openhearth, blast furnace and low phos grades are sailing along at ceiling prices and no complaints are heard — unless the quality doesn't come up to snuff. But cast is different. A major consumer is now buying cupola cast at $47 a gross ton, $1 lower than previously. Offers were made to buy at $45 and $46 but no sales at those figures were reported. Dealers say their buying prices have not yet been reduced.

New York—Some brokers and dealers see competition tightening and perhaps cutting down the profit margin. The scrap industry is geared to handle a huge volume of scrap and seems disappointed when shipments ease. The market here can be described as fair. Scrap at the dealer level is tight and car procurement is still a nuisance. Mixed yard cast was pegged at $42 a ton following a purchase.

St. Louis—Movement of scrap iron to this district showed some improvement the latter part of the week. But still there is only token buying by the mills—giving an order if a dealer needs one to move material. One of the mills has two furnaces down for repairs, and is asking shippers to string out the dispatch of cars. The demand for cast iron grades continues slow, and consumers will buy only in truck loads, declining carloads at any price. On the other hand, there has been some demand for rail ends by the foundries.

Birmingham—Scrap market here is very dull. A little blast furnace material and openhearth scrap is moving north but no sales are reported in this district. The cast market is also very sluggish but no price changes have occurred.

Detroit — Blast furnace grades gained some strength here as mills both in the district and Pittsburgh stepped up purchases. Openhearth and electric grades are in strong demand, the latter unusually so. After struggling along on scanty inventories, mills here are beginning to gain on consumption.

Cleveland—Dealers here hope to lay down more yard scrap as mills continue to live off storage and intransit supplies. Top grades are moving but shipments generally are restricted. Good grades still command ceiling prices. Market is expected to remain quiet until well after the first of the year.

Cincinnati—Buying in this area is generally limited to basing point as consumers remain stingy on springboard limits. Most mills are slowly depleting their inventories and aiming at year end balance. There is some indication that cast scrap and turnings might soften in the near future. Mills are willing to pay good springboards on scarce electric furnace and railroad scrap. Yard receipts within a 70-mile radius are slow.

Boston—The scrap trade in the New England area reports practically no change in the market for this week. The single price move occurred when a few buyers went to $38 for mixed cupola cast, making the current quotation a range of $37 to $38. Steel grades are still moving freely with consumers demanding the quality they pay for.

West Coast — Market continued weak in openhearth grades up and down the coast as mills continued to work on large inventories. The cast market also continued weak.

Iron and Steel SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments.)

GRADES	OPS No.	Pittsburgh, Johnstown, Brackenridge, Butler, Midland, Monessen, Sharon	Youngstown, Canton, Steubenville, Warren, Weirton	Cleveland, Buffalo, Cincinnati, Middletown	Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville	Sparrows Pt., Bethlehem, Ashland, Ky., Kokomo, Ind., Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham, Alabama City, Atlanta	Minnequa	Houston	Los Angeles, Pittsburg, Cal., Portland, Ore., San Francisco, Seattle
Switching Charge, Dollars per gross ton		$0.99, .75, .53, .65, .75, .51, .75	.75, .51, .51, .75, .70	.76, .83, .65, .26	1.34, .79, .50, .20, .51, .51	.20, .52, .47, .51, .51	.51	.95	.50	.78	.50, .43, .51	.33	.57	.66, .65, .52, .66, .59
No. 1 bundles	1	$44.00	$44.00	$43.00	$42.50	$42.00	$41.00	$41.15	$40.00	$39.50	$39.00	$38.00	$37.00	$35.00
No. 1 busheling	2	44.00	44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	35.00
No. 1 heavy melting	3	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 2 heavy melting	4	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 2 bundles	5	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
Machine shop turnings	6	34.00	34.00	33.00	32.50	32.00	31.00	31.15	30.00	29.50	29.00	28.00	27.00	25.00
Mixed borings and turnings	7	38.00	38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Shoveling turnings	8	38.00	38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Cast iron borings	10	38.00	38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
No. 1 chemical borings	26	41.00	41.00	40.00	39.50	39.00	38.00	38.15	37.00	36.50	36.00	35.00	34.00	32.00
Forge crops	11	51.50	51.50	50.50	50.00	49.50	48.50	48.65	47.50	47.00	46.50	45.50	44.50	42.50
Bar Crops and plate	12	49.00	49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Punchings and plate	14	46.50	46.50	45.50	45.00	44.50	43.50	43.65	42.50	42.00	41.50	40.50	39.50	37.50
Electric furnace bundles	15	46.00	46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Cut struc., plate, 3 ft and less	16	47.00	47.00	46.00	45.50	45.00	44.00	44.15	43.00	42.50	42.00	41.00	40.00	38.00
Cut struc., plate, 2 ft and less	17	49.00	49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Cut. struc., 1 ft and less	18	50.00	50.00	49.00	48.50	48.00	47.00	47.15	46.00	45.50	45.00	44.00	43.00	41.00
Foundry steel, 2 ft and less	20	44.00	44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	35.00
Foundry steel, 1 ft and less	21	46.00	46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Heavy trimmings	24	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 1 RR heavy melting	RR 1	46.00	46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Scrap rails, random lengths	RR 14	48.00	48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Scrap rails, 3 ft and less	RR 16	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Scrap rails, 2 ft and less	RR 17	52.00	52.00	51.00	50.50	50.00	49.00	49.15	48.00	47.50	47.00	46.00	45.00	43.00
Scrap rails, 18 in. and less	RR 18	54.00	54.00	56.00	52.50	52.00	51.00	51.15	50.00	49.50	49.00	48.00	47.00	45.00
Rerolling rails	RR 15	53.00	53.00	52.00	51.50	51.00	50.00	50.15	49.00	48.50	48.00	47.00	46.00	44.00
Uncut tires	RR 20	48.00	48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Cut tires	RR 21	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Cut bolsters and side frames	RR 23	49.00	49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
RR specialties	RR 24, 28, 29	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Solid steel axles	RR 25	58.00	58.00	57.00	56.50	56.00	55.00	55.15	54.00	53.50	53.00	52.00	51.00	49.00
No. 3 steel wheels	RR 27	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Unassorted	RR 35	40.00	40.00	39.00	38.50	38.00	37.00	37.15	36.00	35.50	35.00	34.00	33.00	31.00

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

Under Ceiling Scrap Prices

Pittsburgh

Machine shop turnings	$32.00
No. 1 machinery cast	52.00
Heavy breakable cast	45.00
Malleable	55.00

Chicago

Low phos. forge crops	$50.00 to $51.00
Cut struc., plate, 3 ft & less	44.50 to 45.50
Cut struc., plate, 2 ft & less	46.50 to 47.50
Cut struc., plate, 1 ft & less	47.50 to 48.50
Machine shop turnings	30.00 to 31.50
Mixed borings, turnings	34.00 to 35.50
Shoveling turnings	34.00 to 35.50
Cast iron borings	34.00 to 35.50
Cupola cast	43.00 to 44.00
Heavy breakable cast	40.00 to 41.00
Malleable	48.00 to 49.00
Stove plate	41.00 to 42.00
Clean auto cast	47.00 to 48.00
Charging box cast	41.00 to 43.00
Drop broken mach'y	47.00 to 48.00
Unstripped motor blocks	35.00 to 37.00
Cast iron brake shoes	40.00 to 41.00

Philadelphia Area

Clean cast chem. borings	$36.50 to $37.00
Cupola cast	46.00 to 47.00
Unstripped motor blocks	34.00 to 36.00
Charging box cast	45.00 to 46.00

Cleveland

Cast iron borings	$34.00 to $34.50
Stove plate	45.00 to 46.00
Malleable	54.00 to 55.00

Youngstown

Cast iron borings	$35.00 to $35.50

Buffalo

No. 1 machinery cast	$49.00 to $50.00
No. 1 cupola cast	46.00 to 47.00

Birmingham

Shoveling turnings	$30.00 to $32.00
Cast iron borings	30.00 to 32.00
No. 1 Cupola cast	46.00 to 47.00
Stove plate	41.50 to 42.50
Charging box cast	36.00 to 38.00
Heavy breakable	36.00 to 38.00
Unstripped motor blocks	39.00 to 40.00

New York

Brokers' Buying prices per gross ton, on cars:

Clean cast chem. borings	$30.00 to $30.50
No. 1 machinery cast	47.00 to 49.00
Mixed yard cast	42.00
Charging box cast	44.00 to 45.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	34.00 to 35.00

Boston

Brokers' Buying prices per gross ton, on cars:

Mixed cupola cast	$37.00 to $38.00
Heavy breakable cast	$39.00 to 40.00
Stove plate	36.00 to 37.00
Unstripped motor blocks	30.00 to 30.25

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 cupola cast	$48.00
Heavy breakable cast	$43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron brake shoes	39.00 to 40.00

Cincinnati

No. 1 cupola cast	$49.00
Stove plate	46.00
Drop broken cast	$51.00 to 52.00

St. Louis

Charging box cast	$43.00 to $44.00
No. 1 cupola cast	48.00 to 49.00
Heavy breakable cast	41.00 to 42.00
Unstripped motor blocks	38.00

San Francisco

No. 2 heavy melting	$31.00
No. 2 bundles	29.00
Machine shop turnings	14.00
No. 1 cupola cast	44.00

Los Angeles

No. 2 heavy melting	$31.00
No. 2 bundles	29.00
Machine shop turnings	14.00
Shoveling turnings	20.00
No. 1 cupola cast	46.00

Seattle

No. 2 bundles	$29.00
No. 1 cupola cast	43.00
Heavy breakable	35.50

Hamilton, Ont.

No. 1 hvy. melting	$35.50
No. 1 bundles	35.50
No. 2 bundles	35.00
Mechanical bundles	33.50
Mixed steel scrap	31.50
Mixed borings, turnings	32.50
Rails, remelting	35.50
Rails, rerolling	44.80
Bushelings	30.50
Bush, new fact, prep'd	33.50
Bush, new fact, unprep'd	32.50
Short steel turnings	32.50
Cast scrap	50.00

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COLD ROLLED STEEL
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Standard and Production Sizes or Cut to Actual Working Dimensions

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 25 1952	Nov. 18 1952	Oct. 28 1952	Nov. 27 1951
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.775¢	3.775¢	3.775¢	3.60¢
Cold-rolled sheets	4.575	4.575	4.575	4.35
Galvanized sheets (10 ga)	5.075	5.075	5.075	4.80
Hot-rolled strip	3.725	3.725	3.725	3.50
Cold-rolled strip	5.20	5.20	5.20	4.75
Plate	3.90	3.90	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Strains C-R strip (No. 302)	36.75†	36.75†	36.75†	36.75
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50
Bars and shapes: (per pound)				
Merchant bars	3.95¢	3.95¢	3.95¢	3.70¢
Cold finished bars	4.925	4.925	4.925	4.55
Alloy bars	4.675	4.675	4.675	4.30
Structural shapes	3.85	3.85	3.85	3.65
Stainless bars (No. 302)	31.50†	31.50†	31.50†	31.50
Wrought iron bars	10.05	10.05	10.05	9.50
Wire: (per pound)				
Bright wire	5.225¢	5.225¢	5.225¢	4.85¢
Rails: (per 100 lb)				
Heavy rails	$3.775	$3.775	$3.775	$3.60
Light rails	4.25	4.25	4.25	4.00
Semifinished Steel: (per net ton)				
Rerolling billets	$59.00	$59.00	$59.00	$56.00
Slabs, rerolling	59.00	59.00	59.00	56.00
Forging billets	70.50	70.50	70.50	66.00
Alloy blooms, billets, slabs	76.00	76.00	76.00	70.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.325¢	4.325¢	4.325¢	4.10¢
Skelp	3.55	3.55	3.55	3.35

† Add 4.7 pct. to base and extras.

Composite: (per pound)				
Finished steel base price	4.376¢	4.376¢	4.376¢	4.131¢
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$60.69	$60.69	$60.69	$57.97
Foundry, Valley	55.00	55.00	55.00	52.50
Foundry, Southern, Cin'ti	58.93	58.93	58.93	55.58
Foundry, Birmingham	51.38	51.38	51.38	48.88
Foundry, Chicago†	55.00	55.00	55.00	52.50
Basic del'd Philadelphia	59.77	59.77	59.77	57.09
Basic, Valley furnace	54.50	54.50	54.50	52.00
Malleable, Chicago†	55.00	55.00	55.00	52.50
Malleable, Valley	55.00	55.00	55.00	52.50
Ferromanganese	226.25	226.25	226.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.

‡Average of U. S. prices quoted on Ferroalloy pages.

Composite: (per gross ton)				
Pig iron	$55.26	$55.26	$55.26	$52.72
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$43.00*
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	41.50*
No. 1 steel, Chicago	41.50*	41.50*	41.50*	41.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos., Youngstown	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	49.00†
No. 1 cast, Philadelphia	*46.50*	47.50	47.50	49.00†
No. 1 cast, Chicago	43.50	43.50	44.50	49.00†

* Basing pt., less broker's fee. † Shipping pt., less broker's fee.

Composite: (per gross ton)				
No. 1 heavy melting scrap	$42.00	$42.00	$42.00	$42.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.21⅜†	$1.21¼	$1.21¼	$1.03
Zinc, East St. Louis	12.50	12.50	12.50	19.50
Lead, St. Louis	*13.80*	14.30	13.30	18.80
Aluminum virgin ingot	20.00	20.00	20.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	34.50	34.50	39.00	50.00

† Tentative.

Composite Price Notes

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Warehouse Price Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over Alloy bars: 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb, (2)1500 to 3499 lb, (3)6000 lb or over, (4)450 to 1499 lb.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.81	7.17	8.42-8.57	6.42	.....	6.30-6.47	6.47	6.41-6.71	7.18-7.43	.....	.....	.....	.....
Birmingham	.15	5.80	6.65	7.70[1]	5.80	.....	6.10	5.95-6.71	5.80	8.25-8.40	.....	.....	.....	.....
Boston	.20	6.48-6.52	7.35-7.52	8.59-8.63	6.55	8.50[3]	6.75-6.80	6.56-6.75	6.38-6.54	7.63	10.78	11.15-11.18	.....	13.18
Buffalo	.20	5.76-5.80	6.60-6.65	8.40-8.41	6.16-6.21	6.19	6.26-6.37	5.96-6.08	5.76-5.90	6.00-6.95	10.70	11.00-11.07	12.70	12.51-14.42
Chicago	.20	5.80-5.81	6.65	8.00	5.83-5.84	.....	5.95-6.00	5.95-6.98	5.83	6.56-6.92	.....	10.65	.....	12.65
Cincinnati	.15	6.13	6.72	8.47	6.14	.....	6.47	6.42	6.13	7.16	.....	11.07	.....	13.07
Cleveland	.20	5.80-5.81	6.65	8.14	6.00-6.01	.....	6.12-6.17	6.28-	5.89	6.66-6.90	.....	10.79	.....	12.79
Denver	.....	7.17	.....	.....	7.43-7.69	8.90	7.37	7.50-7.80	7.61-7.71	8.24	.....	.....	.....	.....
Detroit	.20	6.00-6.07	6.81-6.92	8.64	6.13	7.99	6.45-6.47	6.12-6.45	6.12-	6.975-7.21	10.72	10.92	12.72	13.02
Houston	.20	6.74-6.79	7.78-7.79	8.68	6.61-6.75	9.80	6.63-7.07	6.66- 6.79	6.82-6.98	9.00-9.62	11.90	11.90	.....	13.90
Indianapolis	del'd.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas City	.20	6.47	7.31	8.50-8.72	6.51	8.07	6.62-6.67	6.62	6.50	7.57	11.15-11.90	11.45-12.20	13.13-13.88	13.43-14.18
Los Angeles	.20	6.60	8.45-8.49	9.65	6.75-6.78	9.15	6.66-6.71	6.60-6.64	6.60-6.62	8.36-8.69	.....	12.05	.....	14.60
Memphis	.10	6.56	.....	.....	6.60	.....	6.71	6.71	6.57-6.83	7.98-9.98	.....	.....	.....	.....
Milwaukee	.20	5.97-5.98	6.82	8.17	6.00-6.01	.....	6.12-6.17	6.12	6.00	6.83-7.07	.....	10.82	.....	12.82
New Orleans	.15	6.28	7.12	.....	6.32	.....	6.43	6.43	6.31	7.85	.....	.....	.....	.....
New York	.30	6.26-6.69	7.27-7.60	8.31[2]-8.42	6.56-7.05	9.53	6.60-7.19	6.39-6.70	6.59-6.89	7.53-7.73	10.74-10.98	11.04-11.28	12.74-12.97	13.04-13.27
Norfolk	.20	7.10	.....	.....	6.81	.....	6.64	7.25	6.44	8.45	.....	.....	.....	.....
Philadelphia	.25	6.11-6.38	7.13-7.92	8.30-8.79	6.45-7.45	.....	6.24-6.86	6.17-6.42	6.42-6.68	7.45-7.69	10.57-10.74	10.79-11.04	12.74	12.79-13.04
Pittsburgh	.20	5.80-5.81	6.65	8.00-8.45	5.94-5.97	.....	6.00	5.95	5.83	6.66-6.90	.....	10.65	.....	12.65
Portland	.20	7.60-7.85	9.07-9.45	10.25	7.60-7.65	.....	7.30	7.30	7.35	9.45	.....	.....	.....	.....
Salt Lake City	.20	8.30	.....	10.90[4]	8.45	.....	7.85	8.00	8.40	.....	.....	.....	.....	.....
San Francisco	.15	6.90	8.20	10.00-10.40	6.90	9.25-9.70	6.75-6.85	6.50-6.70	6.70	8.40-8.70	.....	12.05	.....	14.60
Seattle	.20	7.16-7.36	8.23-8.83	9.80-10.00	7.39-7.69	.....	7.04-7.19	6.75-6.95	7.24-7.44	9.37-9.42	.....	11.70	.....	13.70
St. Louis	.20	6.10-6.30	6.94-7.83	8.30-8.39	6.14	9.73	6.35-6.60	6.35	6.13-6.33	6.96-7.40	10.65	10.95	12.65	12.95
St. Paul	.15	6.47	7.31	8.71	6.50	.....	6.61	6.61	6.49	7.32	.....	.....	.....	.....

HIGH SIGN FOR STEEL PIPE

THE increasing amount of standard steel pipe being used to support TV antennae is another sign of the ever-growing demand for steel in the West.

Much of the pipe used for these supports is Kaiser Steel continuous weld pipe which assures great safety and strength. It's one of a diversified line of steel products produced by Kaiser Steel to provide a nearby, dependable source to help meet the West's many needs.

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tin plate • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PILING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str Low Alloy	Hot rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$76.00 *B3*			3.90 *B3*	5.80 *B3*				
	Buffalo, N. Y.			$59.00 *B3*	$70.50 *B3* *R3*	$76.00 *B3*, *R3*		4.675 *B3*	3.90 *B3*	5.80 *B3*	3.725 *B3*, *R3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				$77.50 *A2*	$83.00 *A2*					4.125 *A2*		5.90 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$59.00 *B3*	$70.50 *B3*	$76.00 *B3*			3.90 *B3*	5.80 *B3*	3.725 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.60 *A5* 5.85 *D1*		
	Phoenixville, Pa.								6.10 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.725 *B3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.45 *R4*		
MIDDLE WEST	Alton, Ill.										4.20 *L1*			
	Ashland, Ky.										3.725 *A7*			
	Canton-Massillon, Ohio				$70.50 *R3*	$76.00 *R3* $78.60 *T5*								
	Chicago, Sterling, Ill.			$59.00 *U1*	$70.50 *U1*, *R3*, *W8*	$76.00 *U1*, *R3*, *W8*		4.675 *U1*	3.85 *U1*, *W8*	5.80 *U1*	3.725 *A1*, *W8* 4.725 *N4*	5.35 *A1*		
	Cleveland, Ohio				$70.50 *R3*							5.10 *A5*, *J3*		7.45 *J3*
	Detroit, Mich.	$56.00 *R5*	$57.00 *R5*		$73.50 *R5*	$79.00 *R5*					4.025 *G3* 4.40 *M2*	5.30 *G3* 5.45 *M2* 5.60 *D1* 6.05 *D2*	6.30 *G3*	8.15 *G3*
	Duluth, Minn.													
	Gary, Ind. Harbor Indiana			$59.00 *U1*	$70.50 *U1*	$76.00 *U1*, *Y1*		4.675 *I3*	3.85 *I3* *U1*	5.80 *I3*, *U1* 6.30 *Y1*	3.725 *I3*, *U1*, *Y1*	5.35 *I3*	5.65 *I3*, *U1* 6.15 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											5.10 *A7*		
	Niles, Ohio Sharon, Pa.										4.225 *S1*	5.70 *T4* 5.80 *S1*	5.65 *S1*	7.30 *S1*
	Pittsburgh, Pa. Midland, Pa.	$54.00 *U1*	$57.00 *U1*, *C11*	$59.00 *U1*, *J3*	$70.50 *U1*, *J3*	$76.00 *U1*, *C11*	3.55 *U1* 3.65 *J3*	4.675 *U1*	3.85 *U1*, *J3*	5.80 *U1*, *J3*	3.725 *J3*, *A7* 3.975 *A3* 4.225 *S7*, *S9*	5.10 *J3*, *A7* 5.45 *A3* 5.80 *B4*, *S2*		
	Portsmouth, Ohio													
	Weirton Wheeling, Follansbee, W. Va.								4.10 *W3*		3.825 *W3*	5.10 *W3*	6.10 *W3*	7.95 *W3*
	Youngstown, Ohio					$76.00 *Y1*, *C10*	3.55 *U1* *R3*			6.30 *Y1*	3.725 *U1*, *Y1*, *R3*	5.10 *R3*, *Y1* 5.70 *C5* 5.80 *B4*	5.65 *R3*, *U1* 6.15 *Y1*	7.30 *R3* 7.80 *Y1*
WEST	Fontana, Cal.	$81.00 *K1*	$83.00 *K1*	$78.00 *K1*	$89.50 *K1*	$95.00 *K1*			4.45 *K1*	6.40 *K1*	4.975 *K1*	6.75 *K1*	6.55 *K1*	
	Geneva, Utah				$70.50 *C7*				3.85 *C7*	5.80 *C7*				
	Kansas City Mo.								4.45 *S2*		4.325 *S2*			
	Los Angeles Torrance, Cal.				$89.50 *B2*	$96.00 *B2*			4.45 *C7*, *B2*	6.35 *B2*	4.475 *C7*, *B2*	6.85 *C1*	6.40 *B2*	
	Minnequa, Colo.								4.30 *C6*		4.775 *C6*			
	San Francisco Niles, Pittsburg, Cal				$89.50 *B2*				4.40 *B2* 4.56 *P9*	6.30 *B2*	4.475 *C7*, *B2*		6.40 *B2*	
	Seattle, Wash.				$89.50 *B2*				4.50 *B2*	6.40 *B2*	4.725 *B2*		6.65 *B2*	
SOUTH	Atlanta, Ga.										4.275 *A8*			
	Birmingham, Ala. Alabama City, Ala.			$59.00 *T2*					3.85 *T2*, *R3*	5.80 *T2*	3.725 *T2*, *R3*			
	Houston, Texas		$65.60 *S2*		$78.50 *S2*	$84.00 *S2*			4.25 *S2*		4.125 *S2*			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25* lb. base box	Electro* *0.25* lb. base box	Hollowware Enameling *29* ga.	
													Bethlehem, Pa.
3.775 *B3*	4.575 *B3*				5.675 *B3*	6.925 *B3*							Buffalo, N. Y.
													Claymont, Del.
													Coatesville, Pa.
4.175 *A2*					5.925 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.325 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
3.775 *B3*	4.575 *B3*	5.075 *B3*			5.675 *B3*	6.925 *B3*	7.775 *B3*		4.425 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.625 *A5*				Worcester, Mass.
									4.425 *R4*				Trenton, N. J.
									4.70 *L1*				Alton, Ill.
3.775 *A7*		5.075 *A7*	4.925 *A7*										Ashland, Ky.
		5.075 *R3*											Canton-Massillon Ohio
3.775 *W8*					5.675 *U1*				4.325 *A5*, *N4*, *R3*				Chicago, Sterling, Ill.
3.775 *R3*, *J3*	4.575 *R3*, *J3*		4.925 *R3*		5.675 *R3*, *J3*	6.925 *R3*, *J3*			4.325 *A5*				Cleveland, Ohio
3.975 *G3*	4.775 *G3*				6.225 *G3*	7.475 *G3*							Detroit, Mich.
													Duluth, Minn.
3.775 *I3*, *U1*, *Y1*	4.575 *I3*, *U1*, *Y1*	5.075 *I3*, *U1*	4.925 *U1*	5.475 *U1*	5.675 *I3*, *U1* 6.175 *Y1*	6.925 *I3*, *U1* 7.425 *Y1*			4.325 *Y1*	$8.70 *U1*, *I3*, *Y1*	$7.40 *U1*, *I3*	6.10 *U1*, *Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.275 *G2*	5.50 *G2*	5.625 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
		5.475 *C9*											Kokomo, Ind.
	4.575 *A7*		4.925 *A7*	5.475 *A7*									Middletown, Ohio
4.175 *S1*					5.675 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
3.775 *U1*, *J3*, *A7* 2.925 *A3*	4.575 *U1*, *J3*, *A7*	5.075 *U1*	4.925 *U1*		5.675 *U1*, *J3*	6.925 *U1*, *J3*	7.625 *U1*		4.325 *A5* 4.525 *P6*	$8.70 *U1*, *J3*	$7.40 *U1*, *J3*	6.10 *U1*	Pittsburgh, Pa. Midland, Pa.
									4.525 *P7*				Portsmouth, Ohio
3.775 *W3*, *W5*	4.575 *W3*, *W5*	5.075 *W3*, *W5*		5.475 *W3*, *W5*	6.625 *W3*	7.275 *W3*				$8.70 *W3*, *W5*	$7.40 *W3*, *W5*	6.35 *W5*	Weirton, Wheeling, Follansbee, W. Va.
3.775 *U1*, *R3*, *Y1*	4.575 *R3*, *Y1*	5.775 *R1*	4.925 *Y1*	6.05 *E2*	5.675 *R3*, *U1* 6.175 *Y1*	6.925 *R3* 7.425 *Y1*		5.65 *E2* 5.825 *R1*	4.325 *Y1*	$8.70 *R3*			Youngstown, Ohio
4.725 *K1*	5.525 *K1*				6.625 *K1*	7.875 *K1*			5.125 *K1*				Fontana, Cal.
3.875 *C7*													Geneva, Utah
													Kansas City, Mo.
4.475 *C7*		5.825 *C7*						5.575 *C7*	5.125 *C7*, *B2*				Los Angeles, Torrance, Cal.
									4.575 *C6*				Minnequa, Colo.
4.475 *C7*	5.525 *C7*	5.825 *C7*							4.975 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.575 *T2*, *R3*	4.575 *T2*	5.075 *T2*, *R3*			5.675 *T2*			4.925 *R3*	4.325 *T2*, *R3*	$8.80 *T2*	$7.50 *T2*		Birmingham, Ala. Alabama City, Ala.
									4.725 *S2*				Houston, Tex.

† Special coated mfg terne deduct 95c from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box.
* COKES: 1.50-lb add 25c.
ELECTRO: 0.50-lb add 25c; 0.75-lb add 65c.

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfgr's. Bright
EAST	Bethlehem, Pa.				4.675 *B3*	6.00 *B3*	5.925 *B3*					
	Buffalo, N. Y.	3.95 *B3,R3*	3.95 *B3,R3*	4.975 *B5*	4.675 *B3,R3*	6.00 *B3,B5*	5.925 *B3*	3.90 *B3*			5.95 *B3*	
	Claymont, Del.							4.35 *C4*		5.35 *C4*		
	Coatesville, Pa.							4.35 *L4*		5.75 *L4*		
	Conshocken, Pa.							4.35 *A2*	4.95 *A2*		6.20 *A2*	
	Harrisburg, Pa.							6.50 *C3*	6.50 *C3*			
	Hartford, Conn.			5.475 *R3*		6.45 *R3*						
	Johnstown, Pa.	3.95 *B3*	3.95 *B3*		4.675 *B3*		5.925 *B3*	3.90 *B3*		5.25 *B3*	5.95 *B3*	5.225 *B3*
	Newark, N. J.			5.375 *W10*		6.35 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.475 *W10*								
	Sparrows Pt. Md.		3.95 *B3*					3.90 *B3*		5.25 *B3*	5.95 *B3*	5.325 *B3*
	Worcester, Mass.					6.35 *A5*						5.525 *A5*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.45 *L1*
	Ashland, Ky.							3.90 *A7*				
	Canton-Massillon	3.95 *R3*		4.925 *R2,R3*	4.675 *R3* 4.72 *T5*	5.99 *T5* 6.00 *R2,R3*						
	Chicago, Sterling, Ill.	3.95 *U,W8, R3* 4.55 *N4*	3.95 *R3* 4.70 *N4*	4.925 *A5,B5, W8,W10*	4.675 *R3, U1, W8*	6.00 *B5,L2, R3,W8,W10* 6.05 *A5*		3.90 *U1,W8*	4.95 *U1*	5.25 *U1*	5.95 *U1*	5.225 *A3, N4,R3* 5.325 *K2* 5.475 *W7*
	Cleveland, Ohio	3.95 *R3*	3.95 *R3*	4.925 *A5,C13*		6.00 *C13* 6.05 *A5*	5.925 *R3*	3.90 *R3,J3*	4.95 *J3*		5.95 *R3,J3*	5.225 *A5, C13,R3*
	Detroit, Mich.	4.10 *R5* 4.30 *G3*		5.075 *R5,P8* 5.175 *P3*	4.825 *R5* 5.025 *G3*	6.15 *R5,P8* 6.20 *P3*	6.675 *G3*	4.45 *G3*			6.90 *G3*	
	Duluth, Minn.											5.252 *A5*
	Gary, Ind. Harbor, Indiana	3.95 *I3, U1, Y1*	3.95 *I3, U1, Y1*	4.925 *L2, M5,R3*	4.675 *I3, U1, Y1*	6.90 *L2,M5, R3,R5*	5.925 *I3, U1,* 6.425 *Y1*	3.90 *I3, U1, Y1*	4.95 *I3*	5.25 *U1*	5.95 *I3, U1* 6.45 *Y1*	5.325 *M4*
	Granite City, Ill.							4.60 *G2*				
	Kokomo, Ind.											5.325 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							4.15 *S1*		5.70 *S1*	5.95 *S1*	
	Pittsburgh, Pa. Midland, Pa.	3.95 *U1, J3*	3.95 *U1, J3*	4.925 *A5, J3, W10,R3,C8*	4.675 *U1, J3, C11*	6.00 *C8,C11, W10,* 6.05 *A5*	5.925 *U1, J3,*	3.90 *U1, J3*	4.95 *U1, J3*	5.25 *U1, J3*	5.95 *U1, J3*	5.225 *A5, J3* 5.475 *P6*
	Portsmouth, Ohio											5.625 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.10 *W3*						3.90 *W5* 4.20 *W3*				
	Youngstown, Ohio	3.95 *U1, Y1, R3*	3.95 *U1, Y1, R3*	4.925 *Y1*	4.675 *U1,C10, Y1*	6.00 *C10, Y1*	5.925 *U1* 6.425 *Y1*	3.90 *U1, Y1, R3*			5.95 *R3* 6.45 *Y1*	5.225 *Y1*
WEST	Fontana, Cal.	4.65 *K1*	4.65 *K1*		5.725 *K1*		6.975 *K1*	4.50 *K1*		6.20 *K1*	6.55 *K1*	
	Geneva, Utah							3.90 *C7*			5.95 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.275 *S2*							5.825 *S1*
	Los Angeles, Torrance, Cal.	4.65 *C7,B2*	4.65 *C7,B2*	6.375 *R3*	5.725 *B2*		6.625 *B2*					6.175 *C7,B1*
	Minnequa, Colo.	4.40 *C6*	4.75 *C6*					4.70 *C6*				5.475 *C6*
	San Francisco, Niles, Pittsburg, Cal.	4.65 *C7,P9* 4.70 *B2*	4.65 *C7,P9* 4.70 *B2*				6.675 *B2*					6.175 *C6,C7*
	Seattle, Wash.	4.70 *B2*	4.70 *B2*				6.675 *B2*	4.80 *B2*			6.85 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.475 *A8*
	Birmingham, Ala. Alabama City, Ala.	3.95 *T2,R3*	3.95 *T2,R3*				5.925 *T2*	3.90 *T2,R3*			5.95 *T2*	5.225 *T2, R3*
	Houston, Texas	4.35 *S2*	4.35 *S2*		5.075 *S2*			4.30 *S2*				5.625 *S2*

Turn to Page 147

IN VAPOR DEGREASING

WHEN SO MUCH

DEPENDS ON A QUALITY SOLVENT

IT PAYS TO SPECIFY

SPEEDY, DEPENDABLE...

"TRICLENE" D Trichlorethylene is the result of over 20 years of research and practical experience in the degreasing field. Made under carefully controlled conditions by the pioneer manufacturer of degreasing solvents in the U. S., each shipment of "Triclene" D is carefully pretested for stability and purity... must meet test standards higher than those established by military and federal specifications (MIL-7003 and O-T-634). Yet "Triclene" D costs no more than other leading brands of degreasing solvents.

"Triclene" D is available nationally in 55 gallon drums and tank cars of various sizes. Distribution points in over 100 principal cities are ready to serve you with prompt deliveries. And trained Du Pont technical representatives with broad experience in the field will be happy to work closely with you in keeping your degreasing installations operating at peak efficiency.

E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

Send for your copy of "Vapor Degreasing with Du Pont Non-Flammable Solvents." It shows you how and where "Triclene" D can be used to save time and cut costs in metal cleaning.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Delaware

Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used . . . and more facts on Du Pont "Triclene" D. We are interested in cleaning____products.

Name_____ Position_____

Firm_____

Street & No._____

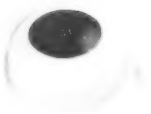
City_____ State_____

DU PONT 150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

PREFORM

In instances where more than one draw is required to produce the part, a stack of two or three blanks can often be preformed at one time.



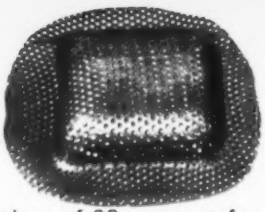
PIERCE, TRIM AND BLANK

In some applications the Hydroform can be tooled to pierce and trim materials during the forming operation. Blanking intricate shapes from very thin materials is possible.

EDGE

Edging, or sharpening the radius between the flange and the wall of the part, is easily done on the Hydroform. Hydroform edging produces the same effect as restriking in a conventional die.

Cover of 0.064" 2SO Aluminum. Hydroformed in 2 operations.



Strainer of 20 gage perforated cold rolled steel. Hydroformed in 1 operation.

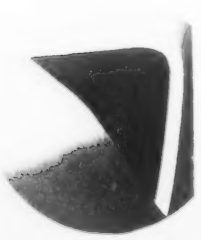
Cover of 0.040" 3SO Aluminum. Hydroformed in 1 operation.

Cap of ⅜" cold rolled steel. Hydroformed in 1 operation.

Here's what you can do by Hydroforming

HOLD CLOSE TOLERANCES

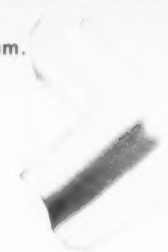
Close tolerances can be held by Hydroforming. The part at left is a diaphragm, shown before and after trimming. The two parts, of 0.010" stainless steel, were produced to mate with an air-tight fit. Part height can be held within ±0.005" tolerance.



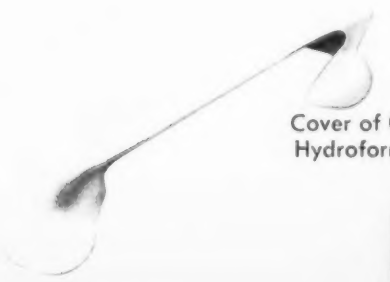
SANDWICH

Parts consisting of two or three *different* materials can be drawn simply by placing blanks together. Cut-away view shows a part formed by placing a blank of aluminum between two blanks of cold rolled steel.

Angle assembly of 0.075" Aluminum. Hydroformed in 1 operation.



Aircraft detail of 0.040" Aluminum. Hydroformed in 1 operation.



Cover of 0.032" Aluminum. Hydroformed in 1 operation.

Vessel of ¼" cold rolled steel. Hydroformed in 1 operation.

PRODUCE DEEP DRAWN PARTS WITH VERY FEW LIMITATIONS AS TO SHAPE

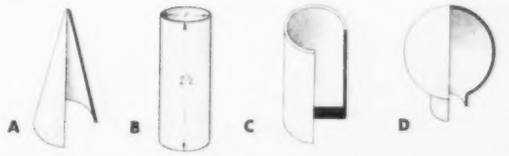
Hydroforming has revolutionized deep drawing. The parts and forming operations illustrated on the opposite page show the extreme versatility of this process. Note the wide variations in part shape. Note, too, that Hydroforming is *not* confined simply to the production of round or symmetrical parts.

WORK WITH A WIDE RANGE OF MATERIALS

Parts can be Hydroformed of steel, aluminum, magnesium, copper, aluminized steel, brass, plastics, insulating materials and precious metals. High-strength alloys successfully Hydroformed include titanium, Inconel, Nimonic 75, L-605, stainless steels, stainless-clad copper.

Blank thickness can range from foils to $\frac{3}{8}$" mild steel. Blanks ranging up to 32" maximum diameter can be drawn in standard machines. Larger equipment available on application.

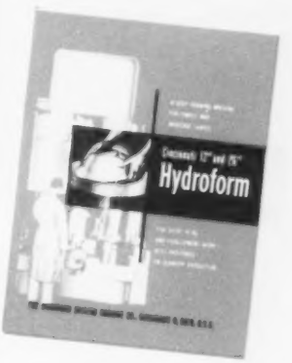
There are several basic shapes that cannot be practically Hydroformed. It is not practical to form sharp, pointed conical shapes (Fig. A). Straight-walled cup shapes having a depth to diameter ratio of $2\frac{1}{2}$ or more to 1 are not practical to form (Fig. B). Parts similar to shell casings which have a relatively thin wall as compared to a thicker closed end cannot be Hydroformed (Fig. C). Bulged parts having a small opening are impractical to form. Parts of this type with a large opening can be made using a segmented punch for removal after forming (Fig. D).



With the few exceptions noted above, practically *any shape* can be Hydroformed. In addition, Hydroforming brings to industry many other benefits affecting the time and cost of producing deep drawn parts. Only simple, low-cost tooling is required. Most parts are produced in a single draw. Part quality is materially improved. Surface finish is unimpaired.

Investigate Hydroforming now. It will change your thinking on deep drawing and forming. Let a Cincinnati Milling Machine Co. field engineer give you detailed information on how Hydroforming can be profitably applied to your production.

CINCINNATI 12" HYDROFORM Also built in 19", 23", 26", 32" standard sizes.

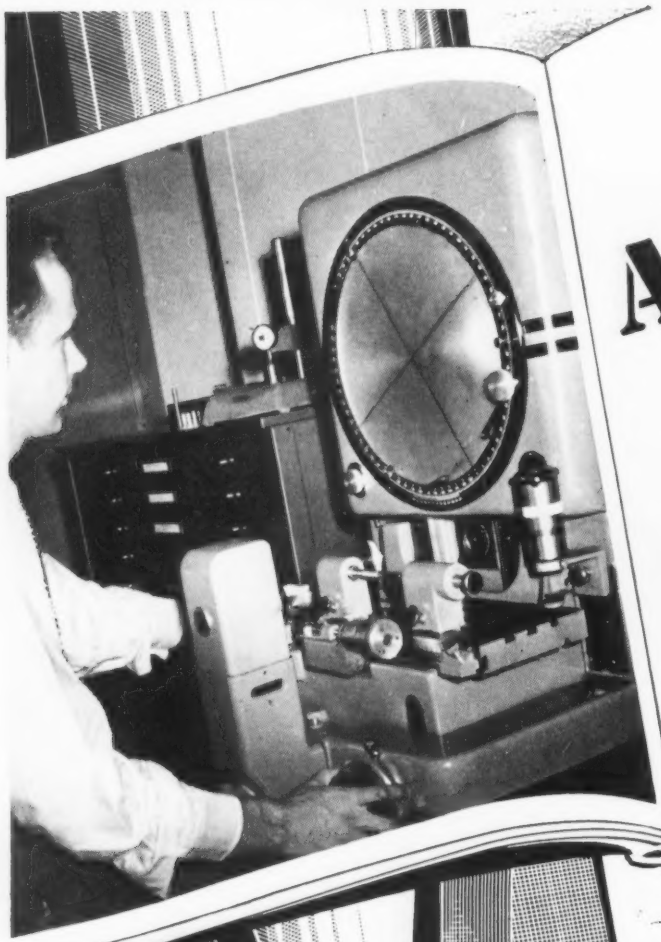


Write for your copy of Hydroform Bulletin M-1759

Hydroform

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO



THE AMERICAN STORY

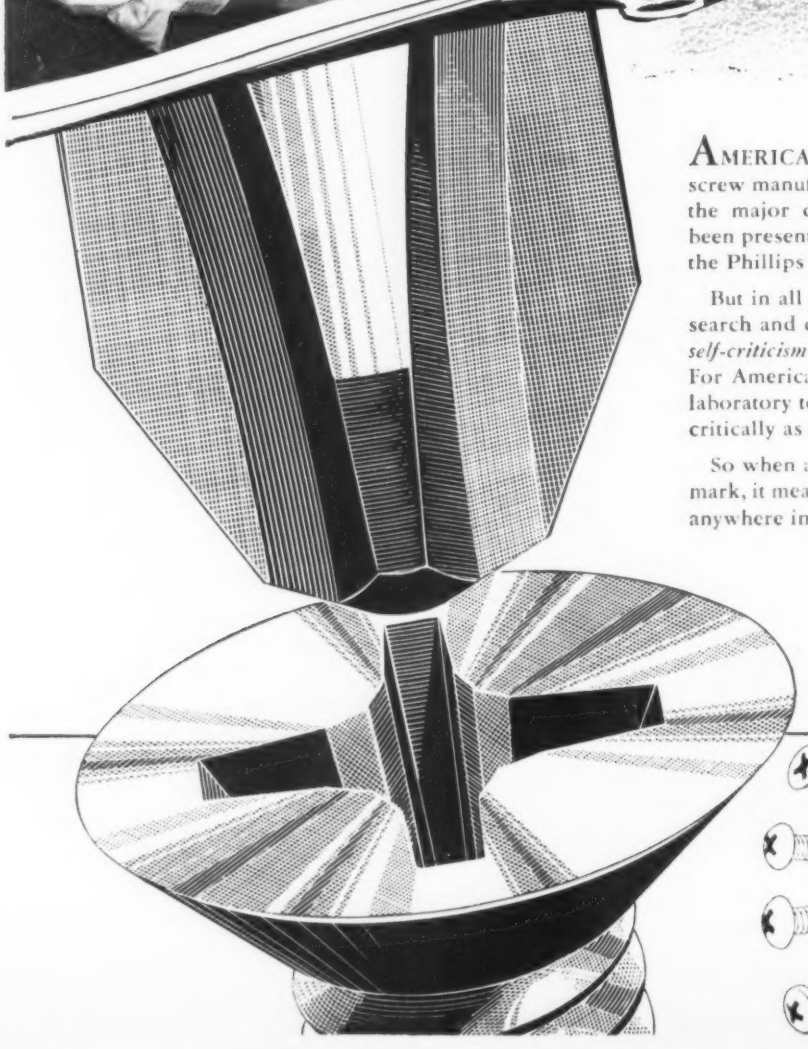
CHAPTER 3:

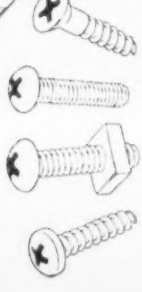
Self-Criticism

AMERICAN started out 114 years ago as the first screw manufacturer in this country. Since then, most of the major developments in threaded fastenings have been presented under the Eagle trademark . . . including the Phillips Recessed Head Screw.

But in all this time, American has stayed ahead in research and development because of one basic thing . . . *self-criticism*. And that means *constructive* self-criticism. For American was the first to establish an engineering laboratory to put the "Eagle-eye" on its own product as critically as on its competitors.

So when any product goes out under the Eagle trademark, it means that that product is as fine as can be made anywhere in the world today. *Try it and see.*



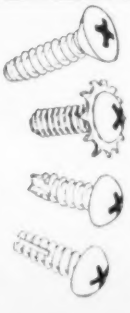


AMERICAN SCREW COMPANY

PHILLIPS HEADquarters

WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.



Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp. Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessees Coal & Iron Div., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	Fence Posts Col	Single Loop Bale Ties Col	Twisted Barbless Wire Col	Gal. Barbed Wire Col	Merch. Wire Annl'd ¢/lb.	Merch. Wire Gal. ¢/lb.
Alabama City *R3*†‡	118	135		132		144	6.075	6.325
Aliquippa, Pa. *J3*	127	141				148	6.075	6.525
Atlanta *A8*	130	140		135		149	6.325	6.675
Bartonville *K2*	127	139	140	132	148	148	6.075	6.50
Buffalo *W6*								
Chicago *N4**†	118	137		132	146	146	6.075	6.40
Cleveland *A6*								
Cleveland *A5*							6.075	6.225
Crawfordsvl *M4*	130	140		134		149	6.175	6.55
Donora, Pa. *A5**†	118	133		132		142	6.075	6.225
Duluth *A5*	118	133		132		142	6.075	6.225
Fairfield, Ala. *T2**†	118	133		132		142	6.075	6.225
Houston *S2*	135	147				156	6.475	6.925
Johnstn, Pa. *B3*	127		148		149			6.575
Joliet, Ill. *A5**†	118	133		132		142	6.075	6.225
Kokomo, Ind. *C9*			142				6.175	6.425
Los Angeles *B2*							7.025	
Kansas City *S2*	139			144		160	6.675	7.125
Minnequa *C6**†	123	146	138	137		153	6.325	6.70
Monessen *P6*								
Moline Ill. *R3*			136					
Pittsburg, Cal. *C7**†	137	156		156	162	162	7.025	7.125
Monessen *P6*	127	138			147	147	6.075	6.45
Portsmouth *P7*	132						6.47	
Rankin, Pa. *A5**†	118	133				142	6.075	6.225
So. Chicago *R3**†	118	135	140	132		144	6.075	6.325
S. San Fran. *C6*				156		167	7.025	7.40
Sparrows Pt. *B3*	129			134	151			6.675
Struthers, O. *Y1*‡							6.075	6.475
Torrance, Cal. *C7**†	138						7.025	
Worcester *A5**†	124						6.375	6.525
Williamsport, Pa. *S10*								

Cut Nails, carloads base $7.80 per 100 lb. (less 20¢ to jobbers) at Conshohocken Pa. (*A2*) Wheeling, W. Va. (*W5*) $7.80.

*** Add 45¢ per 100 lb. on Std. & Coated Nails.**

† Zinc extra if not included on Galv. Merch. Wire.

‡ Galv. Merch. Wire based on 15¢ Zinc.

STAINLESS STEELS

Base price, cents per lb., f.o.b. mill. Add 4.7 pct to base and extras.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2;* (type 316 add 4.5¢) *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Lockport, N. Y., *R4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2* (type 316 add 4.5¢); W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C7,* Lockport, N. Y., *S4;* Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7;* Wallingford, Conn., *W1.*

Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1,F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Lockport, N. Y., *S4;* Canton, O., *T5;* Ft. Wayne, *J4.*

Wires: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3* (type 416 add ½¢); Butler, Pa., *A7;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Lockport, N. Y., *S4;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. *B3*	30.5	8.25	33.5	12.25	35.5	15.75	36.5	16.25	37.0	17.25	37.5	17.75	38.0	18.25						
Youngstown *R3*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Fontana *K1*	21.0	1.25	24.0	2.75	26.5	6.25	27.0	6.75	27.5	7.75	28.0	8.25	28.5	8.75						
Pittsburgh *J3*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	24.0	2.25	27.0	5.75	29.0	7.75
Alton, Ill. *L1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Sharon *M3*	32.5	9.25	35.5	13.25	38.0	16.25	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.25						
Pittsburgh *N1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0		27.0		29.0	
Wheeling *W5*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Wheatland *W4*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75						
Youngstown *Y1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Indiana Harbor *Y1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Lorain *N2*	32.5	15.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	30.25	9.5	34.25	13.5	36.25	17.0	36.75	17.5	37.25	18.5	37.75	19.0	38.25	19.5						
Youngstown *R3*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Fontana *K1*	20.75		24.75		26.75		27.25		27.75		28.25		28.75							
Pittsburgh *J3*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	23.75	2.0	27.75	6.5	31.25	10.0
Alton, Ill. *L1*	29.25	8.5	33.25	12.5	35.25	16.0	35.75	16.5	36.25	17.5	36.75	18.0	37.25	18.5						
Sharon *M3*	32.25	10.5	36.25	14.5	38.25	17.5	38.75	18.0	39.25	18.5	39.75	19.0	40.25	19.5						
Pittsburgh *N1*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75		27.75		31.25	
Wheeling *W5*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Wheatland *W4*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0						
Youngstown *Y1*	32.25	11.5	36.25	15.5	37.75	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	22.5	23.75	4.5	27.75	8.5	31.25	12.0
Indiana Harbor *Y1*	31.25	10.5	35.25	14.5	37.25	17.5	37.75	18.5	38.25	19.5	38.75	20.0	39.25	20.5						
Lorain *N2*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	12.0

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt. 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢; Threads only buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3¾ pts. higher discount. Buttweld jobbers' discount, 5 pct. St. Louis zinc price now 12.5¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$25.58
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	21.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	23.21
Neville Island	23.00
Lone Star, Tex., f.o.b.	18.50

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*		7.85	9.10	9.90	10.45	11.00	11.70
Brackenridge *A3*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Granite City *G2*		8.55	9.80				
Ind. Harbor *I3*	7.35	7.85	9.10				
Mansfield *E2*	7.35	7.85	9.10	9.90			
Niles, O. *N3*	7.35	7.85					
Vandergrift *U1*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Warren, O. *R3*	7.35	7.85	9.10				
Zanesville *A7*	7.35	7.85	9.10	9.90	10.45	11.00	11.70

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in pipe is $5 a ton above 6-in.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	23.93	28.14	23.19	27.28
	2½	12	32.17	37.83	31.19	36.67
	3	12	35.78	42.11	34.69	40.82
	3½	11	44.72	52.65	43.36	51.05
	4	10	55.52	65.31	53.83	63.32
National Tube	2	13	22.81	27.94	22.23	
	2½	12	31.28	38.31	30.51	
	3	12	35.87	43.93	34.98	
	3½	11	42.56	52.12		
	4	10	54.02	66.16		
Pittsburgh Steel	2	13		28.58		
	2½	12	32.16	39.19		
	3	12	36.87	44.93		
	3½	11	43.76	53.32		
	4	10		67.68		

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

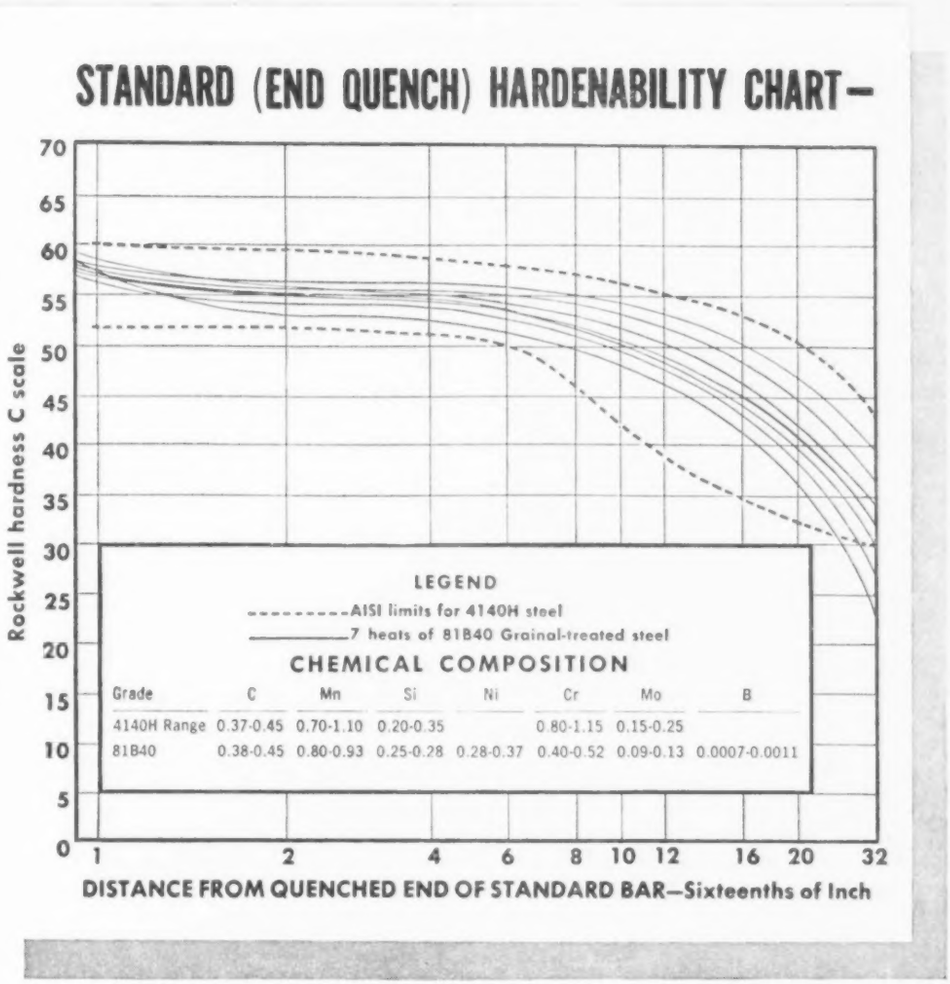
Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery
Bethlehem *B3*	56.50	57.00	57.50	58.00		
Birmingham *R3*	50.88	51.38				
Birmingham *W9*	50.88	51.38				
Birmingham *S5*	50.88	51.38				
Buffalo *R3*	54.50	55.00	55.50			
Buffalo *H1*	54.50	55.00	55.50			66.75
Buffalo *W6*	54.50	55.00	55.50			
Chicago *I4*	54.50	55.00	55.00	55.50		
Cleveland *A5*	54.50	55.00	55.00	55.50	59.50	
Cleveland *R3*	54.50	55.00	55.00			
Daingerfield, Tex. *L3*	50.50	51.00	51.00			
Duluth *I4*	54.50	55.00	55.00	55.50		
Erie *I4*	54.50	55.00	55.00	55.50		
Everett, Mass. *M6*		59.25	59.75			
Fontana *K1*	60.50	61.00				
Geneva, Utah *C7*	54.50	55.00				
Granite City, Ill. *K3*	56.40	56.90	57.40			
Hubbard, Ohio *Y1*	54.50	55.00	55.00			
Jackson, Ohio *J1,G1*						65.50
Minnequa *C6*	56.50	57.50	57.50			
Monessen *P6*	56.50					
Neville Island *P4*	54.50	55.00	55.00	55.50		
Pittsburgh *U1*	54.50			55.50		
Sharpsville *S3*	54.50	55.00	55.00	55.50		
Steelton *B3*	56.50	57.00	57.50	58.00	62.50	
Swedeland *A2*	58.50	59.00	59.50	60.00		
Toledo *I4*	54.50	55.00	55.00	55.50		
Troy, N. Y. *R3*	56.50	57.00	57.50		62.50	
Youngstown *Y1*	54.50	55.00	55.00	55.50		
N. Tonawanda, N. Y. *T1*		55.00	55.50			

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton net for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn.* *S7*	5.80	7.65	8.25	10.20	12.50
Carnegie, Pa. *S9*		7.65	8.25	10.20	12.50
Cleveland *A5*	5.10	7.30	8.25	10.20	12.50
Detroit *D1*	6.45	7.50	8.10		
New Castle, Pa. *B4*	5.80	7.65	8.25	10.20	
New Haven, Conn. *D1*	6.70	7.60	8.20		
Sharon, Pa. *S1*	5.80	7.65	8.25	10.20	12.50
Trenton, N. J. *R4*		7.95	8.55	10.50	12.80
Warren, Ohio *T4*	6.20	7.65	8.25	10.20	12.50
Weirton, W. Va. *W3*	5.80	7.65	8.25	10.20	12.50
Worcester, Mass. *A5*	5.40	7.60	8.55	10.50	12.80
Youngstown *C5*		7.65	8.25	10.20	12.50

*Sold on Pittsburgh base.



Consistent Hardenability obtained in Boron Steels made with GRAINAL ALLOYS

The most common test for boron steels is measurement of hardenability by the end quench or Jominy hardenability test. Today's steel substitutions are made on the basis of similar hardenability since a reasonable prediction can thus be made of the hardness and strength of a given part.

The curves above show the relationship between the hardenability of a series of seven heats of 81B40 steel and the hardenability band for 4140H steel, which it often replaces. The 81B40 heats were made in one electric furnace shop, and the remarkably consistent hardenability shown by the curves was obtained by the use of Grainal alloy as the means of adding the boron.

Consistent hardenability means consistent strength and hardness after heat treatment, which is the aim of every fabricator. The best proof that the Grainal alloys insure this objective is found in the successful use of three million tons of Grainal-treated steels.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

MAKERS OF ALLOYS VANCORAM CHEMICALS AND METALS

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.775	4.25	4.925				
Chicago *R3*				6.65			
Cleveland *R3*							
Ensley *T2*	3.775	4.25					
Fairfield *T2*		4.25		6.65		4.775	
Gary *U1*	3.775	4.25				4.775	
Ind. Harbor *I3*	3.775		4.925	6.65		4.775	
Johnstown *B3*		4.25					
Joliet *U1*		4.25	4.925				
Kansas City *S2*							
Lackawanna *B3*	3.775	4.25	4.925			4.775	
Lebanon *B3*				6.65			
Minnequa *C6*	3.775	4.75	4.925	6.65		4.775	9.85
Pittsburgh *R3*							
Pittsburgh *O1*							
Pittsburgh *P5*							
Pittsburgh *J3*				6.65			
Pitt'g, Cal. *C7*						4.925	
Seattle *B2*				7.15		4.925	
Steelton *B3*	3.775		4.925			4.775	
Struthers *Y1*				6.65			
Torrance *C7*						4.925	
Youngstown *R3*				6.65			

TOOL STEEL

F.o.b. mill

Add 4.7 pct to base and extras.

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Add 4.7 pct to base and extras.

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J*	*29.5	
Claymont, Del. *C*	*28.00	
Conshohocken, Pa. *		*27.50
New Castle, Ind.	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

* Includes annealing and pickling, or sandblasting

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.45
35	65, 110	8.45
30	65, 84, 1	8.45
24	72 to 104	8.45
20	84, 90	8.45
17	60, 72	8.45
14	60, 72	9.02
10, 12	60	9.30
8	60	9.58

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

70% or more $43.00
60% or less 40.00

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg. Reg.	K. Reg.	Less Keg. Hvy.	K. Hvy.
½ in. & smaller.	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	22	1	16½
1⅝ in. & larger.	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger.	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger.	8½	23	2	17½

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	35	45	28½	29½
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger.	13	26	8½	23
		Light		
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished 48—10
Packaged, plain finish ..... 31—10
Bulk, plain finish** 62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net

Rivets *Base per 100 lb*

½ in. & larger $7.85

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	36
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	32
Plow bolts	34	

REFRACTORIES

Fire Clay Brick *Carloads, per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) ..$94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) .. 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore .. 93.00

Grain Magnesite *St. 5/8-in grains*

Domestic, f.o.b. Baltimore in bulk fines removed $62.70
Domestic, f.o.b. Chewalah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢...$13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 26, 1952

Gross Ton

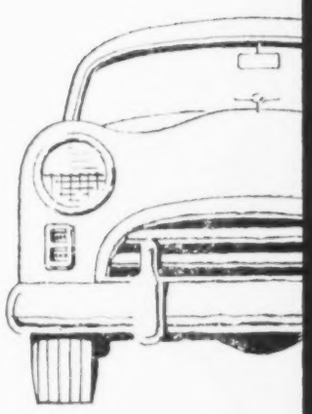
Old range, bessemer $9.45
Old range, nonbessemer 9.30
Mesabi, bessemer 9.20
Mesabi, nonbessemer 9.05
High phosphorus 9.05

After adjustments for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 1, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags... 10.9¢
Canadian sponge iron, del'd. in East ..... 13.0¢
Domestic sponge iron, 98+% Fe, carload lots ..... 15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe. 83.0¢ to $1.48
Aluminum ..... $1.5¢
Brass, 10 ton lots ..... 30.00¢ to 33.25¢
Copper, electrolytic 10.75¢ plus metal value
Copper reduced ...10.00¢ plus metal value
Cadmium, 100-199 lb 95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd $3.50
Lead .... 7.5¢ to 12.0¢ plus metal value
Manganese ..... 57.0¢
Molybdenum, 99% $2.75
Nickel, unannealed ..... 85.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 38.5¢
Solder powder..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 83.00¢
Stainless steel, 316 ..... $1.10
Tin ..... .14.00¢ plus metal value
Tungsten, 99% (65 mesh).. $6.00
Zinc, 10 ton lots .....23.0¢ to 30.5¢



This intricate maze of metal is the valve section of a popular automatic transmission, cast in Gray Iron.

6 Reasons why the final choice was GRAY IRON!

1. Greater rigidity, strength and dimensional stability
2. Greater accuracy—can be held to closer tolerances
3. Greater wear resistance
4. Does not permit dirt to imbed, as do the softer nonferrous materials
5. Desirable thermal expansion characteristics
6. Economy

Intricate components such as the section shown here are economically practical only as integral castings. The final question then becomes—in what material shall they be cast?

This valve section was first experimentally cast in a nonferrous material. However, the final choice was Gray Iron, for the practical reasons listed at the left. These same basic advantages of Gray Iron could well apply to one of *your* current design problems.

Write for technical information on the many advantages of the Gray Iron casting process.

Make it Better with Gray Iron

Second largest industry in the metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

Ferroalloy Prices

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C ...	30.50	0.30% C ...	29.50
0.10% C ...	30.00	0.50% C ..	29.25
0.15% C ...	29.75	1.00% C ...	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% Max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C.	$1.14
0.50% max. C	1.10
9 to 11% C	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed: lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O.	$225
F.o.b. Johnstown, Pa.	$227
F.o.b. Sheridan, Pa.	$225
F.o.b. Etna, Clairton, Pa.	$228

Add $2.80 for each 1% above 82% Mn, subtract $2.80 for each 1% below 78% Mn.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	12.45
Ton lots, packed	14.05

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$84.00	$85.00
Pgh. or Chicago	84.00	85.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn | 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet, contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00. Add $1.055 per ton for each additional 0.50% Si up to and including 17%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carloads	9.90
Ton lots	11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo | $1.15

Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta | $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo | $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton

	$65.00
10 tons to less carload	$75.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti | $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	$1.50
Less ton lots	1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton | $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W5, ton lots, delivered | $5.00

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.

	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 | $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Ton lots	21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.

Carload, bulk	7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B | $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2% C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots, per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots | $1.20

F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.

No. 1	$1.00
No. 6	68¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

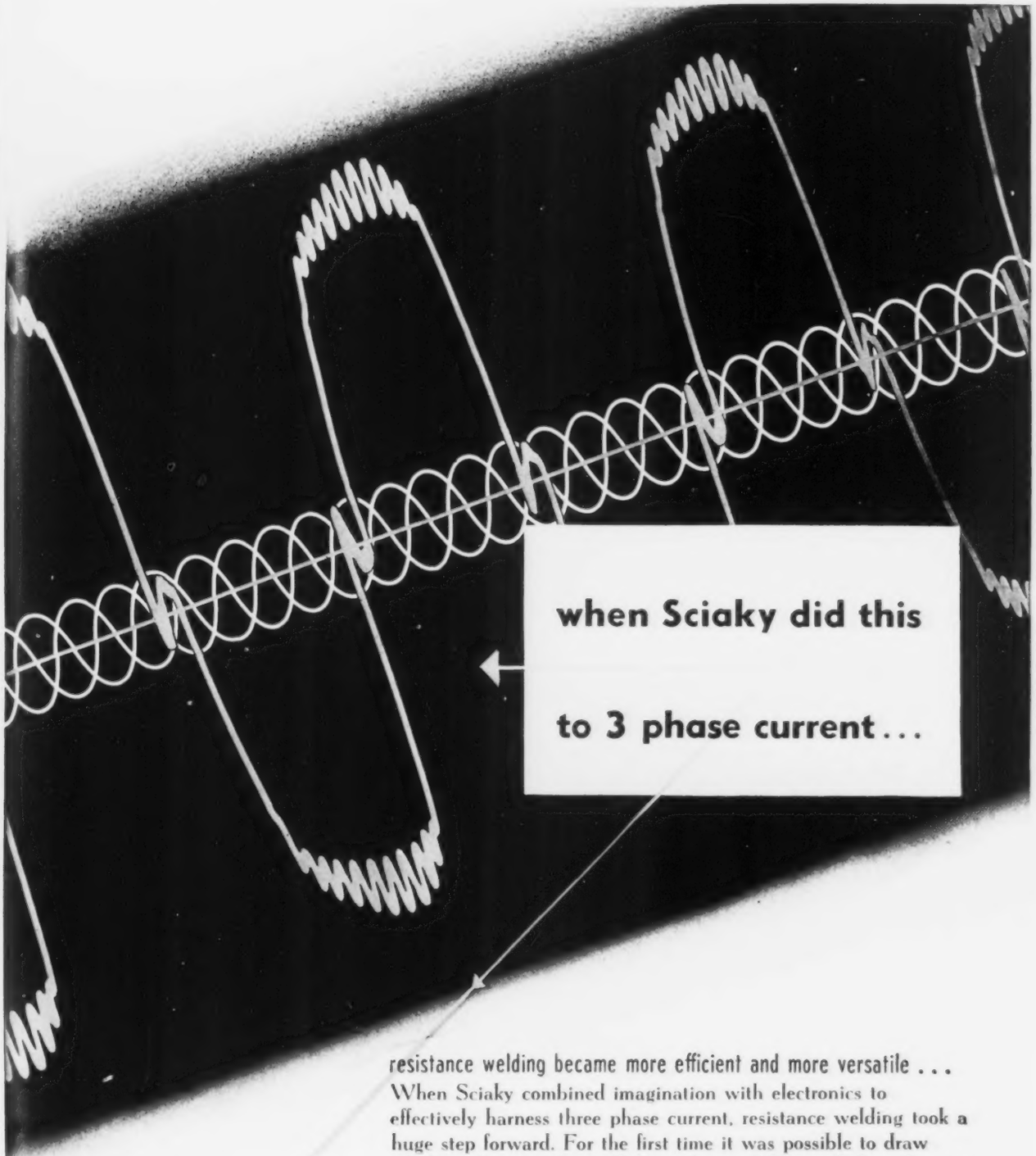
Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered

Less ton lots	$1.36

Silenz, contract basis, delivered.

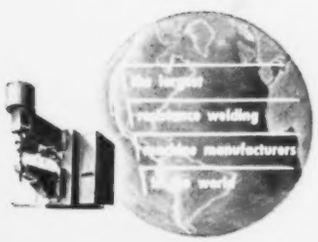
Ton lots	45.00¢



resistance welding became more efficient and more versatile . . .

When Sciaky combined imagination with electronics to effectively harness three phase current, resistance welding took a huge step forward. For the first time it was possible to draw a balanced current from all three phases of the supply line. Power factor jumped to near unity. KVA demand slumped as much as 50% or more of previous requirements. But most important, resistance welding became more versatile. By simple adjustments one machine could weld many different metals in a wide range of thicknesses.

This is the type of engineering that keeps Sciaky out in front . . . makes the Sciaky name the symbol of the best in resistance welding.



SCIAKY

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How

"The Fox and The Stork"

points a moral to Cutting Fluid users

. . . with apologies to Aesop

The Fox was playing host to the Stork at dinner. Being a great prankster, he served nothing but soup in shallow dishes. The poor Stork got nothing to eat because he could get only the tip of his long bill into the soup.

The Stork reciprocated by having the Fox to a dinner at which he served delicious rice in long thin-necked jars. This time the Fox went without food because he couldn't even get his nose into the jar!

THE MORAL.

Like the Fox and the Stork in Aesop's fable, each cutting fluid has its own capabilities. When put on an application for which it is not suited the cutting fluid fails to give you the production, tool life or finish possible.

Stuart offers you a vast background of experience in the *selection and application* of cutting fluids, both water-mixed and straight oil types and has the cutting fluids to best meet your requirements. Ask to have a Stuart Representative demonstrate how proper selection and application of cutting fluids saves time, money and materials. Be sure to ask him for the booklet "More Than a Coolant Is Needed."

More Than a "Coolant" is Needed

D. A. Stuart Oil co.
EST 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2727-37 S. Troy St., Chicago 23, Ill.

Free! Dilut-o-graph

Circular slide rule makes dilution of cutting fluids quick, easy! For tanks of 1 to 100 gallons. Fill in coupon, clip to your company letterhead and mail to:

D. A. STUART OIL CO.
2727-37 S. Troy St., Chicago 23, Ill.

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Title .....

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Machinery Packaging — Faulty packaging is an old but still costly problem. The difficulties of packing machinery were discussed at a recent meeting of the American Assn. of Machinery Importers in New York, and the experiences of these traffic pros can be a useful guide to used machinery dealers.

John Nevins, Jr., manager of terminal operations for the U. S. Lines, told the AAMI members that failure to mark crates correctly is one of the major causes of damage during cargo handling. He said modern materials handling units make it possible to move heavy industrial equipment without sliding it along floors or dropping the crates. But the advantages of these advanced handling techniques are lost if crates aren't properly marked. One result of incorrect crate marking is that wrong size winches are sometimes used, increasing the chances of damage to merchandise.

Sling Marks — In instances where machinery walks out of its case, it usually means the equipment was not properly secured, Mr. Nevins stated. He also stressed the importance of indicating the center of gravity on closed crates so handlers can tell where to place slings. An even better method is to mark the exact sling locations on the crates.

Milton Thalberg, AAMI president, and sales manager, International Machinery Div., British Industries, Inc., said his firm sent a packaging check-list to its machinery manufacturers along with the original order. The check-list, which covers basic points needed to assure safe shipment, is filled out by the manufacturer when the machine is ready for delivery.

Included in the information requested on the form is the name of crater and the rust-proofing method used to protect the machine. The results have been excellent, he said.

By marking crates correctly, used machinery dealers can reduce considerably the cost, paperwork and time loss that result when equipment is damaged in transit. And dealers sidelining in imports of foreign machinery can eliminate many of their problems by sending their manufacturers detailed packaging instructions

APPROVAL SEAL: Milton Thalberg (left), president, American Assn. of Machinery Importers, and Fred Weil, AAMI director (center), show the association's new seal to Laurence Divine, U. S. Lines. Seal will be attached to all new machinery purchased in friendly European countries if importer can guarantee supply of parts in U. S.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS
14" x 12" Pennsylvania Air Compressor, 100# Pressure, Complete with 75 H.P. Syn. Motor
18" & 11" x 14" Sullivan WJ-3 Air Compressor 885 CFM, Driven by 150 H.P. Westinghouse Syn. Motor 440/3/60

BAR TURNING MACHINE
Medart HF-2 Bar Turning Machine, Capacity 1" to 2⅛", Complete with Accessories

BENDING ROLLS
6' x ⅜" Ryerson Pyramid Type Bending Roll
16'x1¼" Hilles & Jones Pyramid Type Bending Roll
20' x 1" Southwark Pyramid Type Bending Roll
30' x 1" Southwark Pyramid Type, Motor Driven

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Leaf Type Bending Brake Motor Driven with 5 H.P. A.C. Motor
12" x 3/16" Chicago #226 Steel Apron Brake, M.D.
16' x ⅜" Dreis & Krump Leaf Type Bending Brake, Motor Dr. with 40 H.P. A.C. Motor

BRAKES—PRESS TYPE
14' All Steel Hydraulic Press Brake 500 Ton Capacity, ½"
10' x 3/16" Dreis & Krump Press Brake, Complete with Electrical Equipment

CHARGING MACHINE
6000 lb. Brosius Floor Type Gasoline Driven Charging Machine, Equipped with Peel, Buda Gasoline Engine, Rubber Tires

CRANES—GANTRY
5 ton Whiting Two Leg Gantry Crane 53' Span Cab Control Motors 220 v. 3 ph. 60 cy.
15 ton P&H Two Leg Gantry Crane 45' Span With 13' Overhand one end 10' other end 5 ton Auxiliary, Two Trolleys and 8 Motors 440 volt 3 phase 60 cycle

CRANE—LADLE
75 ton Morgan Ladle Crane 49'6" Span 4-Girder Construction, with 25 Ton Auxiliary, Complete with Motors for 230 Volt D.C.

CRANES—OVERHEAD ELECTRIC TRAVELING
5 ton Robbins Myers 28'6" Span 220/3/60
10 ton Shaw 67' Span 230 Volt D.C.
10 ton P & H 77' Span 230 Volt D.C. Equipt with 2 hooks spaced 11' apart
10 ton Erie 60' Span 440/3/60 AC
15 ton Niles 60' Span 230 Volt D.C.
20 ton Bedford 50' Span 220/3/60 AC
20 ton Morgan 68' Span 230 Volt DC With 5 ton Auxiliary

DIEING MACHINES
75 ton Henry & Wright High Speed Dieing Machine Double Roll Feed, Scrap Cutter, 3" Stroke
100 ton Henry & Wright Dieing Machine, 4" Stroke, 13" Shut Height, Complete Elecl. Equip.

DIE CASTING MACHINE
Model BA-12 KUX Die Casting Machine, Air operated, Plunger Gooseneck Type for zinc, lead and tin. Die space between bars 12¼" x 12¼". Die Separates 8" NEW 1949, never used

DRAW BENCH
50,000 lb. Draw Bench, Motor Driven with 50 H.P. Motor. Maximum Draw 40 ft.

FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment

FORGING MACHINES
1½", 2", 3", 4", 5", 6" Ajax
1", 2", 3", 5", Acme
5 Ajax—Air Clutch

FURNACE—ANNEALING
Furnace Engr. Co. Bell Type Annealing Furnace Gas Fired, Operating Space 40"x40" Round, 500 CFM Capacity.

FURNACE—HEATING
60 KW Leeds & Northrup Homo Furnace #9478-UB-28, With controls, Work space 28" dia. x 28" deep

FURNACES—MELTING
400 lb. Moore Type "UT" Melting Furnace. Top Charge. Complete with Transformer. New 1948—Little Used
6000 lb. K.I.S. Nose Tilting Furnace. Complete with Transformer Equipment
15 ton Heroult Model V-12 Top Charge Hydraulically Operated. Complete with Transformer Equip.

GEAR REDUCERS
500 H.P. United Combination Reduction Gear & Pinion Stand, Gear Ratio 8.581:1
600 H.P. Farrel Birmingham, Size 18 Reduction Gear, Ratio 720 to 244 RPM
700 H.P. Falk Single Reduction Gear, Ratio 875 to 200 RPM
1800 H.P. Mesta Gear Reduction Unit, Ratio 10:1

GRINDER
No. 4 Cincinnati Centerless Grinder, Motor Driven. Capacity standard work rest 2" to 6" dia., optional work rest ⅛" to 3". Special fixtures will allow work to be handled up to 9" dia.

GRINDER—CYLINDRICAL
14 x 36" Norton Type C. Complete with Elecl. Equip.

HAMMERS—BOARD DROP
1200, 1600 lb. Chambersburg
1000 lb. Billings & Spencer

HAMMER—COUNTER BLOW TYPE
25 ton Counter Blow Drop Forge Hammer, Steam or Air Operated

HAMMER—STEAM DROP
1500 lb. Erie

HAMMERS—STEAM FORGING
1200 lb Massillon Single Frame
1500, 1600, 2000, 3000, 4000, 6000 lb. Chambersburg
600, 1500, 2500 lb. N.B.P.
600, 1100, 1500, 2000, 2500, 3500, 4000 Erie

HAMMERS—MISCELLANEOUS
No. 6N Nazel Hammer, Geared Motor Drive
200 lb. Bradley Compact Hammer, Arr. for Motor Drive with 10 H.P. A.C. Motor
2000 lb. Chambersburg Pneumatic Hammer Complete with Elect. Equip. New 1951
15"x12" Chambersburg Cecostamp Hammer, 18" stroke

LATHE—TURRET
Model 2L Gisholt Geared Head Turret Lathe, Spindle Bore 4-1/16". Elecl. Equipment and numerous accessories incl. NEW 1951

LEVELER—ROLLER
60" Aetna Standard 17-Roll Leveler, 4¾", Dia. Rolls Arr. Motor Drive

MOTORS
1250 H.P. Westinghouse Induction Motor 6600 volt 3 phase 60 cycle 593 R.P.M.
2000 H.P. General Elec. Induction Motor 6600 volt 3 phase 60 cycle 600 R.P.M.
2500 H.P. General Elec. Direct Current Motor 6600 volt 175/350 R.P.M.

MOTOR GENERATOR SET
740 H.P. General Electric Syn. Motor 4400 volt A.C. with two generators 750 KVA 230 volt D.C., Complete with Panel Board, etc.

NAIL MAKING MACHINES
No. 1½ National—Sizes 10D, 12D, 16D, 20D, 30D
No. 3 National—Size 6D
No. 2 Glader—Sizes 6D, 7D, 8D, 9D
Angell—Sizes 10D, 12D, 16D, roofing

PRESSES—EXTRUSION
700 ton Horizontal Extrusion Press, 3-Column Type Ram 26" Diameter, Container suitable for billets 5" x 20"
1200 ton Horizontal Extrusion Press, 3-Column Type Ram 34" Diameter, Suitable for billets 6" dia. x 22" long

WE OFFER A COMPLETE LIQUIDATION SERVICE ON ANY BASIS WHICH CIRCUMSTANCES INDICATE WOULD BE MOST BENEFICIAL, WHETHER BY AUCTION, PRIVATE LIQUIDATION OR OUTRIGHT SALE

CONSULTANTS IN MANUFACTURING PROBLEMS FOR OVER A QUARTER OF A CENTURY

THERE IS NO SUBSTITUTE FOR EXPERIENCE

CONTACT US IN CONFIDENCE WITHOUT COST OR OBLIGATION

PRESSES—HYDRAULIC
Model BL-350 Milwaukee Hydraulic Briquetting Press Complete with Pumps. Capacity Grey Iron Briquettes 3½ tons per hr.
75 ton Williams White Straightening Press 27" Stroke, Bed 8' x 16", 6½" Dia. Ram
200 ton Bliss Hydrodynamic 48" Stroke Bed Area 24" x 24", Hyd. Pump Incl.
500 ton Southwark Hydraulic 24" Stroke, 78" Daylight Platen 64" R to L x 32" F to B
500 ton Southwark Open Throat Hydraulic Press 13" Stroke Platen 56" x 56"
700 ton Elmes Forming Press, 27" Stroke, 30" Dia. Ram, Platen 40" x 88" with overhang 40" x 129", Complete with Pump and Motor

PRESS—HYDRAULIC WHEEL
100 ton Elmes Inclined Hydr. Wheel Press 72" Between Parallel Bars. Complete with Pump & Motor

PRESS—KNUCKLE JOINT
#27 Bliss Knuckle Joint Embossing & Coining Press 1000 ton Capacity, 2½" Stroke, 18" Shut Height

PRESSES—STRAIGHT SIDE
No. 305 Bliss 9" Stroke 14" Shut Height Equipped with Marquette Air Cushion
No. 59 Toledo Double Geared Tie Rod Press 255 ton Friction Clutch 18" Stroke 36¼" x 25" Bed Area
No. 3 Ferracute Super Speed Punch Press 30 ton Capacity, NEW 1946—never used
No. 620 Bliss High Production Press, 1½" Stroke 81-40 Verson 200 ton Press, 36" Stroke Bed Area 40" x 44"
No. 12 Zeh & Hahnemann Patent Percussion Press 150 ton 12" Stroke, 17" x 17" Bed Area
No. 1037-⅝ Hamilton 300 Ton 16" Stroke Bed Area 48" x 104"

PRESS—TOGGLE DRAWING
No. 410A Bliss 650 Ton Double Crank Strokes 25" & 17" Bed Area 60" x 84"

PRESSES—TRIMMING
Bliss S.S. Trimming Press with Side Shear, 250 Ton Capacity, 8" Stroke 52" x 30" Bed Area
No. 3 Erie Flywheel Drive Trimming Press, 3¾" Stroke 12" Between Guides
1500 ton Hydraulic Bending & Trimming Press. Distance between columns 86" x 86"
2500 ton Hydraulic Bending & Trimming Press. Distance between columns 90" x 108"

PUNCH—BEAM
Long & Allstatter Double End Beam Punch, Capacity Beam Punch End—Punch flanges and web 24" I-beam and smaller

PUNCH & SHEAR COMBINATIONS
No. 28 U-30 Buffalo Armor Plate Universal Ironworker. Capacity Punch 1½" thru 1¼", Shear 3" Round 3⅝" Square, 5 x 1⅝" Flat, 5 x 5⅝" Angles
Style EF Cleveland Single End Punch & Shear, M.D. Capacity Punch 1" thru 1¼"

RIVETER
125 ton Hanna Bull Riveter, Air Driven, 24" Gap, 75" Reach, Capacity 1" rivets cold and 1⅛" rivets hot

ROLL—PLATE STRAIGHTENING
7 Roll Bertsch Plate Straightening Machine, Capacity 10' x ⅝" Complete Elecl. Equip.

ROLLING MILLS
7½" Steckel Four High Rolling Mill, Max. Steel Width 6", Work Rolls 2⅛" x 7½", Complete with electrical equipment
8"x10" Schmitz Single Stand Two High
12"x16" Single Stand Two High, Comp. with Elecl. Equip.
12"x24" Waterbury Farrel Two High
15"x30" Mossberg Single Stand Two High
18"x24" Waterbury Farrel Two Stand Two High
20"x30" Two Stand Two High Rolling Mill
20"x36" Poole Two Stand Two High
22"x40" Single Stand Two High
27"x56" United Two High Skin-pass Mill
28"x60" Single Stand Two High
18"x60" Three High Roughing Mill, Complete with billet heating furnace and accessory equipment incl. elecl. equip.

SAWS
No. 749 Espen-Lucas Heavy Duty Cold Saw, Capacity up to and incl. cakes or slabs 48" x 7", Stroke 72", Motor Driven
No. 3 Ryerson Friction Saw, 54" Blade Hydraulic Feed, Complete with Elecl. Equip.
52" Ryerson Friction Saw, 45 H.P. Motor, Capacity Approx. 9" Round, 20" I-beam, 12" H-beam

SHEAR—ALLIGATOR
No. 7 Thomas Carlin Alligator Shear, 16" Blade 30 H.P., D.C. Motor

SHEARS—ANGLE
Hilles & Jones No. 2 Double Angle Shear, M.D. Capacity 6" x 6" x ⅝"
Long & Allstatter Double Angle Shear, Model B Capacity 6x6x⅝", Complete with Elecl. Equip.

SHEAR—BAR
No. LH Lewis Open End Bar Shear, Motor Drive Capacity 1¼" Round

SHEARS—ROTARY
No. 60 Quickwork Rotary Shear, ⅝" Capacity
No. 100 Kling Rotary Shear, 1" Capacity
No. 30 Quickwork Rotary Shear 5/16" Capacity
Quickwork Heavy Duty Circle Shear ⅝" Capacity Complete with Circle Cutting Attachment
No. 25A Quickwork Whiting Rotary Shear ¼" Capacity, with Circle Cutting Attachment, Motor Driven

SHEARS—SQUARING
12'x3/16" Stamco Steel Squaring Shear, Motor Dr.
8' x ¼" Drabert Model THZ 8/2500
6' x ¼" Long & Allstatter, Belted Motor Drive

SLITTERS
24" Torrington Heavy Duty Slitter, Capacity 5 cuts ⅛" mild steel
31" Yoder Sheet Slitter No. 530, Capacity 8 cuts .194" to 8 Cuts .156", Motor Dr.
72" Yoder Gang Slitter, Capacity 5 Cuts 10 Ga.

STRAIGHTENERS
No. 0 Medart Round Straightener, Capacity ⅝"—1⅛" bars, 2" tubing, NEW 1952
No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 2½" bars or 4½" O.D. Pipe or Tubing, NEW 1950
No. 1¼B Sutton Round Straightener, Motor Dr. Capacity Tubing 5/16" to 1⅝"—modified to handle up to 3½" O.D. tubing
No. 1B Sutton Round Straightener, Motor Drive Capacity 3/16" to ⅝" O.D. Friction Drive complete with 1/3 H.P. A.C. Motor
Hallden 8-Roll Strip Straightener & Cutting Machine, Capacity 14" wide 11 Ga. Sheet Steel

STRETCHER
McKay Hydraulic Bar Stretcher, Capacity up to 1¾" dia. in length 12' to 27'

SWAGING MACHINES
No. E4 Langeller, Capacity 1¼" Tubing
No. 408 Etna Swager, Capacity 4" Tubing

TESTING MACHINES
300,000# Southwark Emery Universal Hydraulic
20,000 lb. Southwark Emery Universal Hydraulic

THREAD ROLLER
Model "C" Watson Flagg Precision Thread Roller Capacity up to 3", Incl. Accessories & Electrical Equipment

WELDERS
250 KVA Progressive Model A-6 Flash Welder 440 volt 60 cycle, Mechanical Contactor Hi-Pressure Clamp Assembly—NEW 1949
40,000# Ransome Welding Positioner, Rectangular Table 84" x 84" x 1¾"
McKay Tube or Pipe Welding Unit, Capacity 4¾" to 7¼" O.D. Complete with all accessory equipment and motors

WIRE DRAWING MACHINE
No. 0 Waterbury Farrel 7-Die Wire Drawing Machine, Capacity ¼" rod to #10 copper

MILES' QUALITY

AIR COMPRESSOR, 21"x13"x16" Worthington
AUTOMATIC, 20"x25" Fay (1942)
AUTOMATIC, 8" Bullard Multi-Au-Matic, 6-spindle
AUTOMATIC, 6-spindle Baird chucker
AUTOMATIC, 3¼" & 3¾" Cleveland "A"
BORING MILL, 4" Detrick & Harvey, horizontal, floor type
BROACH, No. 1 Foote Burt duplex surface
BROACH, 2-ton American horizontal hydraulic
BROACH, No. 3XA Oilgear horizontal hydraulic
BROACH, V42 American hydraulic, 18 ton
BULLDOZER, No. 22 Williams & White
DRILL, Nos. 217, 310, 321 Baker
DRILL, No. 36 HO Baker hydraulic
DRILL, 24" Cincinnati upright
DRILL, 12-spindle No. 12 Natco
DRILL, 12-spindle No. 10 Defiance rail type
DRILL, No. B 250 H Natco multiple
DRILL, 36-spindle Baush, adjustable spindle
DRILL, RADIAL, 3½', 8" American sensitive
GEAR HOBBER, No. 12H G&E
GEAR HOBBER, No. 130 Cleveland Rigidhobber
GEAR HOBBER, No. 3 Adams Farwell
GEAR HOBBERS, No. 12 & Type A Barber Colman
GEAR HOBBERS, Nos. 1 and 25 5A Lees Bradner
GEAR SHAVER, 8"-12" Red Ring
GRINDERS CENTERLESS, Two No. 2 Cincinnati,
GRINDER, 6"x30" Cincinnati, type ER, infeed
GRINDERS, 10" x 18" & 10" x 36" Norton Semi-Auto
GRINDER, DISC, 30", No. 8 Badger
GRINDER, DISC, No. 228 Hancshett opposed
GRINDER, DISC, No. 84A Gardner opposed
GRINDER, GEAR, 10" Pratt & Whitney
GRINDER, Internal, Bryant Nos. 5, 16A, 16-28 & 24-36
GRINDERS, INTERNAL, Nos. 72A3 and 72A5 Heald
GRINDERS, SURFACE, 12" and 16" No. 22 Healds
GRINDER, SURFACE, No. 78 Wilmarth & Morman
HAMMER, Nos. 5N & 6B Nazel pneumatic
HAMMER, 40 lb. Bradley helve
HONE, Nos. 172 & 2610 Barnes hydraulic
LATHE, ENGINE, 24"x14' American
LATHE, TURRET, No. 5 Acme universal
LATHE, TURRET, No. 5 Gisholt universal, 1943
LATHE, TURRET, No. 6 W&S, G, H, motor-in-base
MILLERS, Two No. 2 Cincinnati plain
MILLER, 18" Cincinnati automatic
MILLER, 24" Cincinnati automatic duplex
MILLER, type 45 Product-O-Matic
MILLER, 30½" x 21" x 12" Ingersoll 4-spindle planer type
MILLER, 48" x 20" x 20' Ingersoll planer type, 3 vertical heads
MILLER, 48" x 36" x 12' Ingersoll planer type adj. rail
MILLER, 84" Ingersoll 6-spindle rotary continuous
MILLER, PLAIN, No. 3B Milwaukee
MILLER, THREAD, Type C Hall planetary
MILLER, THREAD, Nos. 4, 6 and CT 36 Lees Bradner
NIBBLER, No. 3 Savage rotary
PLANER, 36"x36"x8' Cleveland openside
PLANER, 36"x36"x12' Niles Bement Pond
PRESSES, Nos. P01, P1, P2, P3, PA4, P5 and CA4 Ferracute
PRESS, No. 61 Cleveland OBI
PRESS, No. 6 Toledo OBI
PRESSES, Nos. 56 & 56⅛ Toledo
PRESS, No. 245½ Hamilton s.s. tierod frame
PRESS, No. EG54 Ferracute knuckle joint
PRESS, 600 ton No. 570 Toledo forging
PRESS, No. DA8411 Hamilton double action toggle
PRESS, 100 ton HPM hydraulic
RIVETERS, large variety
ROLL, 20'x3/16" Farnham bending
SLOTTER, 16" Bement Miles crank
SAWS, Three 816S Kalamazoo metal cutting band
SAW, 7" No. 14 Higley cold-cutting
SHAPER, 24" American auto, oiled
SHAPER, 32" Ohio Dreadnaught
SHAPER, 27" Morton draw cut
SHEAR, 38" throat No. 17F New Duty
STRAIGHTENER, No. 0 Sutton for bars
SWAGER, No. 154 Etna
TAPPERS, Two No. 71 Ettco
TAPPER, 19" Hammond sensitive drilling & tapping
TESTER, 230,000 inch-pound Tinius-Olsen No. 2 torsion
TESTER, 100,000 lb. Riehle tensile & compression
THREADERS, 2" Landis pipe threading and cutting
THREADERS, Two ¾" Landis, double spindle
THREADERS, 2" Oster rotary head
UPSETTER, 3" National air clutch
UPSETTERS, Two 4" Ajax heavy duty, twin-gear
WELDER, 100 KVA Thompson automatic spot
WELDER, 100 KVA National Flash
WELDERS, 12" and 14", 12 KVA American Electric Fusion Co. spot.

WRITE FOR CATALOG NO. 193 FOR COMPLETE LISTING

MILES MACHINERY CO.
2025 E. Genesee Ave.
SAGINAW, MICHIGAN

RE-NU-BILT
GUARANTEED

ELECTRIC POWER EQUIPMENT

D.C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	1750	Whse.		600	550/700
1	1500	Whse.		525	600
1	940	Whse.	QM	250	140/170
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
2	450	Whse.		550	415
1	400	G.E.	MCF	550	300/1050
1	350	Cr. Wh.	CCM-151H	230	1100
1	335	Whse.	MQ	250	300/900
1	200/300	G.E.	MPC	230	360/920
1	200	Rel.	1970T	230	720
1	150	G.E.		600	250/750
1	150	Rel.	1400T	230	400/1200
1	150	Cr. Wh.	65H	250	1150
10	150	Cr. Wh.	83H-TEFC	230	960
2	150	Whse.	SK151B	230	900/1800
1	150	Whse.	SK-201	230	360/950
1	50/120	G.E.	MCF	230	250/1000
2	100	Whse.	SK-181	230	450/1000
1	100	G.E.	CDP-115	230	1750

MILL & CRANE

1	50	G.E.	CO-1810	230	725
1	33	Whse.	K-8	230	505
2	30	G.E.	MD-1013½AA	550	700
1	20	Whse.	K-5	230	975
4	15	Whse.	K-5	230	630
8	10	C.W.	SCM-AH	230	1150
1	10	G.E.	MD-104	230	400/800
8	6.25	Whse.	K-3	230	680
4	3	C.W.	SCM-FF	230	1750
2	3	Whse.	HK-2	230	835
1	2¼	Whse.	K-1	230	835

A.C. MOTORS

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1800	G.E.	MT-498	2300	360
1	1500	AIB		2300	720
1	1200	G.E.	MP	2300	275
1	500	Whse.	CW	550	330
1	500	G.E.	IM	440	900
2	500	G.E.	M-574-Y	6600	900
1	500	G.E.	IP	550	505
1	400	Whse.	CW	440	514
1	350	G.E.	MT-442Y	2200/4000	253
1	300	Al. Ch.		440	505
1	250	G.E.	MT-424-Y	4000	257
1	250	G.E.	MT-5598	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
3	200	G.E.	IM17	550	585
8	200	G.E.	IM-17	440	600
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150(unused)	Whse.	CW	2300	435
1	125	Al. Ch.		440	720
4	125	G.E.	MT-566Y	440/2200	435
2	100	G.E.	IM	440	600
5	100	A.C.	ANY	440	695
1	100	G.E.	IM-16	2200	435
1	100	Whse.	CW-868A	440	700

SQUIRREL CAGE

2	850	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	854
1	300	Al. Ch.		2200	385
1	300	G.E.	IK-17	440	580
1	200	G.E.	IK	440	865
8	200	G.E.	KT-557	440	1800
1	150	Whse.	CS-856S	440	850
1	150	Whse.	CS	440	580
1	150/75	G.E.	IK	440	900/450
8	125	Al. Ch.	ARW	2200	1750
1	125	G.E.	KF-6328-Z	440/2200	3595
1	125	Whse.	MS	440	485

SYNCHRONOUS

2	3500	G.E.	TS	2200	257
2	2100	G.E.	ATI	2300	300
2	1750	G.E.	ATI	2300	3600
2	2000	Whse.		2300	120
3	735	G.E.	ATI	2200/12000	600
1	450	Whse.		2200	450
2	350	G.E.	TS	2200	150

M-G Sets — 3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000	G.E.	500	660	11000*
1	2000	G.E.	514	600	6600/13200
8	1500	G.E.	514	250	6600/13200
1	1500	G.E.	720	600	6600/13200
1	1500	G.E.	360	275	4160
8	1500	G.E.	600	600	4160
2	1000	Whse.	900	600	4160
1	1000	G.E.	900	250	6600
1	1000(3U)	G.E.	900	250	2200
1	750	Whse.	900	275	4160
1	500	G.E.	720	125	2300
1	500	Whse.	900	125/250	440
1	500	Whse.	900	250	6600/13200
1	500	Whse.	1200	125/250	2300
1	400	Whse.	1200	250	2300
1	400(3U)	Cr. Wh.	1200	125/250	2300
1	850	G.E.	900	125	2300/4160
1	300	Al. Ch.	1200	125/250	2300
1	150	Whse.	1200	275	2300
1	140(3U)	Cr. Wh.	690	125/250	440/2300
1	100	Delco	1200	120/240	2300
1	100	G.E.	1170	125	220/440

* 25 Cycle

FREQUENCY CHANGER SETS

Qu.	KW	Make	Freq.	Voltages
1	3000	G.E.	25/60	2300/2300/4000
2	2500	G.E.	25/62.5	2300/2300
1	1000	G.E.	25/58.3	4400/2300
1	500	Al. Ch.	2560	11000/2300

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

CIMCO MACHINE TOOLS AT BARGAIN PRICES

Giddings & Lewis 4" bar boring mill
King 42" Vertical Boring Mill, 2 heads
Niles 36-44 Vertical Boring Mill, motor driven, 1 rail and 1 side head
Cincinnati #3 Vertical Mill, single pulley drive
Niles 42"-50" Burnisher, Facer and Box Borer, late type, motorized
Cincinnati-Bickford 4'11" column Radial gear box on base.
Fosdick 6'15" Radial Drill
Fellows 612 Spur Gear Shaper
Fellows 725 Gear Shaper with Spur Guide
Cincinnati 24" Back Geared Shaper
Columbia 28" Back Geared Crank Shaper
Gould & Eberhardt 16" Back Geared Shaper
Gould & Eberhardt 24" Back Geared Shaper
Gould & Eberhardt 28" Back Geared Crank Shaper
Gould & Eberhardt 32" Back Geared Crank Shaper
Gould & Eberhardt 96H Gear Hobber
Gould & Eberhardt 18-H Hobber
Gould & Eberhardt 60BM Gear Rougher
Cincinnati #2 Centerless Grinder
Fitchburg 48" Spline Grinder, late
Heald #50 Internal Grinder
Heald #72A3 Internal Plain Grinder
Heald 70A Internal Grinder, late type
Heald 78 Centerless, Internal & Cylindrical Grinder
Jones & Lamson 8 x 31 Thread Grinder
Landis 26" x 168" Plain Cylindrical Grinder
Landis Type C Plain Grinder, 10 x 18, late type
Landis 16" x 72 Plain Cylindrical Grinder
Oliver Template Tool Bit Grinder
Sellers 4T Tool Grinder, late type
Sellers 6T Tool Grinder, late type
Walker Model DB Surface Grinder, with 12" rotary chuck
Acme #2 Full Universal Turret Lathe 3¼" hole in spindle
Gisholt 1L Saddle Type Turret Lathe, complete with bar feed, late type
Oster 601 Rapiduction Turret Lathe
Blount Model B-3 Special Application Lathe for turning, chucking, polishing and tapping
Lodge & Shipley, 16" x 126" centers, Timken bearing, late type, complete with taper attachment
Lodge & Shipley, 16" x 6' G.H. Lathe, 12 speeds
Lodge & Shipley 18" x 6' G.H. Lathe, 12 speeds
Lodge & Shipley 20" x 8' G.H. Lathe, 12 speeds
American 30" x 14' G.H. Lathe, taper
Monarch 24" x 12' G.H. Lathe, taper
American 36" x 40' G.H. Internal Face Plate Drive, 10 speeds, 33' center distance, taper attachment
LeBlond 21" Universal Mill, 3 SCD, motorized
Brown & Sharpe #3 Plain Miller 4 SCD
Brown & Sharpe 4B Heavy Plain Miller, single pulley drive
Hall Style "D" Planetary Miller, late type
Pond 42 x 42 x 10' Double Housing Planer, DC motor drive, 4 heads
Pond 48 x 48 x 16' Double Housing Planer, DC motor drive, 4 heads
Bliss #37 Coining Press, ¾" stroke, 150 ton
Baker 2i7 Drill Press
Rasmussen 6 x 6 Power Rack Saw

GUARANTEED MACHINERY

This Is A Partial List Of Our Stock. Send Us Your Inquiries.

CINCINNATI MACHINERY COMPANY, INCORPORATED
209 E. Second Street
CINCINNATI 2, OHIO

Barber-Colman Model S Gear Hobbers.
Gleason 3" Straight Bevel Gen. 1942.
Hardinge Model MD47 Bench Lathes, ¾".
Thomas No. 6A O.B.I. Press, 1947.

D. E. DONY MACHINERY CO.
47 Laurelton Road — Rochester 9, N. Y.

FLANGERS, ¾" & ½" McCabe (2)
RADIAL DRILL, 5' 15" Col. Amer. Tri. Purp., M.
RADIAL DRILL, 5' 14" Col. Amer. Tri. Purp., Gear
RADIAL DRILL, 3½' Morris, 9½" col.
LATHE, GAP, 28"/50" x 16' Rahn Larmon M.D.
LATHE, 48" x 20' Bed Amer., T.A., M. D.
LATHE, 14" x 6' Bed Amer., 16½" Sw., T.A., M.D.
SLOTTER, 20" Bement Miles, M.D.

LETCHER W. BENNETT & SONS
P. O. Box 544 — CLIFTON, N. J.
PHONE—PRESCOTT 9-8998

THE CLEARING HOUSE

GUARANTEED TOOLS

16"x78" SIDNEY Toolroom Lathe, chuck, taper, new 1947

60"x20' NILES-BEMENT-POND Geared Head Engine Lathe, rapid traverse

27"x12' MONARCH Geared Head Engine Lathe, taper attachment, AC-MD

24"x72" centers BOYE & EMMES Heavy Geared Head Engine, chuck, AC-MD

No. 28 FOSTER Geared Head Turret Lathe, rapid traverse, AC motors

No. 3L GISHOLT Turret Lathe, 6¼" hole in spindle, bar feed, chuck, tooling, new 1945

42" BULLARD New Era Type Vertical Turret Lathe, AC-MD

36" BULLARD Vertical Turret Lathe converted to Spiral Drive, AC-MD

1½" LANDIS Double Head Bolt Threader, with leadscrews, MD

No. 1 DOUGLAS Plain Horizontal Mill, table 8"x32", power feeds, motor in base, No. 40 taper, new 1942

No. 2 VAN NORMAN Plain Horizontal Mill, power rapid traverse, No. 50 taper, new 1942

No. 3-24 CINCINNATI Plain Hydromatic Mill

5-13" column CARLTON Radial Drill AC motor on arm, 15 to 1500 RPM

4' AMERICAN High Speed Sensitive Radial Drill 9" column, AC motor on arm

No. 914 W. F. & John BARNES Hydraulic Drill, No. 6 Morse taper, 15HP motor, new 1948

3 Spindle FOSDICK Drill Press, individual AC motors for each spindle, 1942

No. 6 TOLEDO O.B.I. Press, 56 Tons

Brand New Model FH-4C01 DENNISON Hydraulic Presses, 4 Ton, 8" throat (3)

10"x24" NORTON Hydraulic Surface Grinder, 1942

25A HEALD Rotary Surface Grinder, 24" diameter, magnetic chuck

36" OHIO Dreadnaught Shaper, AC-MD

75 Ton HENRY & WRIGHT Double Crank Dieing Machine, roll feed & Scrap cutter

No. 22 MURCHEY Threader

No. 135 CLEVELAND Rigidhobbers

O'CONNELL MACHINERY CO.
Tel: BAiley 5800
1693 GENESEE ST. BUFFALO 11, N.Y.

6' American Radial Drill—Serial #55582
#81A Fellows Gear Shaper—Serial #21252
#3 Gisholt Turret Lathe—Serial #2807-1
16" Gould & Eberhardt Shaper
60" Hanchett Face Grinder
Lodge & Shipley Lathe—Serial #29051
#2 Norton Tool & Cutter Grinder—Serial #3555
8D Potter & Johnston Automatic Chucker—Serial #70393
72" King Heavy Duty Vertical Boring Mill Serial No. Lot 38—#175
Roubottom Cam Miller—Serial 135/49. Rebuilt & guaranteed
20" Knight Rotary Table
Rebuilt No. D-8 Colburn Heavy Duty Drill Press—Serial #155
Rebuilt No. 314 Baker 24" Heavy Duty Drill Press—Serial #2-4598
Defiance 3¾" Table Type Horizontal Boring Mill—Serial #870-38

Hazard Brownell Machine Tools, Inc.
350 Waterman St. Providence 6, R. I.

LATE TYPE MACHINERY

AUTOMATIC, 1¾"—4 Spin. Gridley Model G
BOLT THREADER, 1½" Reliance Williams
VERT. Attach. for Boring Mach. for 330T G. & L. Mill & Outer Support
BORING MACH., 3¾" bar Defiance Tble. Type
BORING MACHINE, 3½" Bar G. & L., Tble. Type
BORING MACHINE, 3" Bar Lucas, Table Type
BORING MILL, 100" Cinci., Heavy, 2 Heads, M.D.
BORING MILL, 100" N.B.P., 2 Hds., PRT
BORING MILL, 72" King, 2 Hds., M.D.
BORING MILL, 72" N.B.P., 2 Hds., M.D.
RADIAL DRILL TABLES, 36" x 20" x 20" (10)
RADIAL DRILL, 6' 15" col. Amer., M-on-Arm
RADIAL DRILL, 5' 15" col. Amer., M-on-Arm, Trl.
RADIAL DRILL, 5' 14" Col. Amer., M.D.
RADIAL DRILL, 5' Niles, No. 10, M-on-Arm, Late
RADIAL DRILL, 4' 11" Col. Cinci. Bick., M.D.
RADIAL DRILL, 4' Western, M.D. (2)
RADIAL DRILLS, 3' 8" & 2½" (New)
DRILL, 24" Cinci. Bick., Tapping
DRILL, No. DS Colburn 36", 5" capty.
DRILL, No. 314 Baker, 24", 3" capty.
GEAR CUTTER, No. 13, B. & S. Spur & Bevel
GEAR SHAPERS, Nos. 6 & 75 Fellows
GEAR SHAPER, Nos. 61A, 64A & 64 Fellows, 1945
GRINDER, CYL., 4"x18" Landis #4H
GRINDERS, CYL., 10" x 48" Cinci., M.D.
GRINDER, SURFACE, 30" Blanchard, No. 10, M.D.
GRINDER, SURFACE, 14" P. & W. Vert. Spin. B.B.
GRINDER, UNIV., 12" x 36" Thompson, M.D.
GRINDER, Micro Int. M.D.
GRINDER, No. 6-T Sellers Tool, '42
KEYSEATER, No. 3½ Baker, 26" x 4" capty.
LATHE, 60" x 45' cen. Mackintosh-Hemphill, 1942
LATHE, 48" x 20' Bed Amer., T.A.
LATHE, 48" x 20' Cen. N.B.P., M.D.
LATHE, 32" x 14' S. & B., M.D., T.A.
LATHE, GAP, 28"/50" x 16' Rahn Larmon, T.A.
LATHE, 26"/48" x 24' Bed, McCabe, Dbl. Spin.
LATHES, 26"x12' Bridgeford QCG Grd. Hd., M.D.
LATHE, 25" x 12' Bed, B & E, T.A., Grd. Hd.
LATHE, 20" x 78" Matra, T.A., New
LATHE, 20" x 10' Bed Amer., Grd. Hd.
LATHE, 18" x 8' Bed, L. & S. Select Grd. Hd., M.D.
LATHE, TURRET, No. 3A W. & S., No. 680307
TURRET LATHE, 21" Acme Univ., Brass, Late
TURRET LATHE, No. 1B Foster, Univ. 2" capty. (2)
TURRET LATHE, No. 2B Foster, Univ. 3¼" capty.
TURRET LATHE, No. 3 AL Gisholt, 6¼" H. S.
TURRET LATHE, No. 3 Gisholt, Bar & Chuck
THREAD MILLER, 12" x 60" Morey Shield, '43
MILLER, Abene (like Van Norman) New
MILLER, No. 000 B. & S. Plain, M.D. Late
MILLER, No. 0 Sundstrand Rigidmil Hand
MILLER, No. 2 Van Norman, Duplex, M.D.
MILLERS, No. 3 Cinci. Pl. Motorized
MILLER, No. 4 Cinci., High Power Universal
MILLER, No. 22L Van Norman Ram Type
MILLER, UNIV., Nos. 3 & 2 Cinci.
MILLER, No. 2 Stand, K. & T.
MILLER, UNIV., No. 1½ B Special K. & T. M.D.
PLANER, FROG & SWITCH, 42" x 18" x 18' N.B.P.
PLANER, PLATE, 30" x 1" Cleveland, M.D.
PRESS, Hydr., 200 Ton, Sectional Flanging
PRESS, No. 73½, Bliss S.S., 6" Stroke, 70 ton capty.
PRESS, No. 58, Toledo SS, Grd., 171 Ton capty.
SHAPER, 36" Morton Draw Cut
SHAPERS, 32", 28", 20" & 16" Gould & Eberhardt
SHAPER, 24" Gemco "Kelly" Univ. Tble., '42
SQUARING SHEAR, 8' x 3/16", Geo. Ohl

BENNETT MACHINERY CO.
375 Allwood Rd., Clifton, New Jersey
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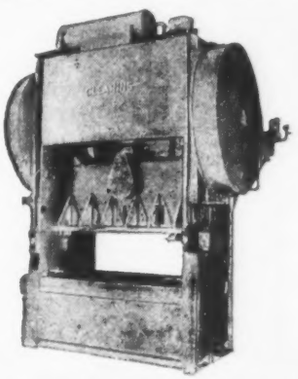

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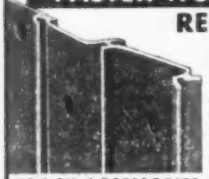

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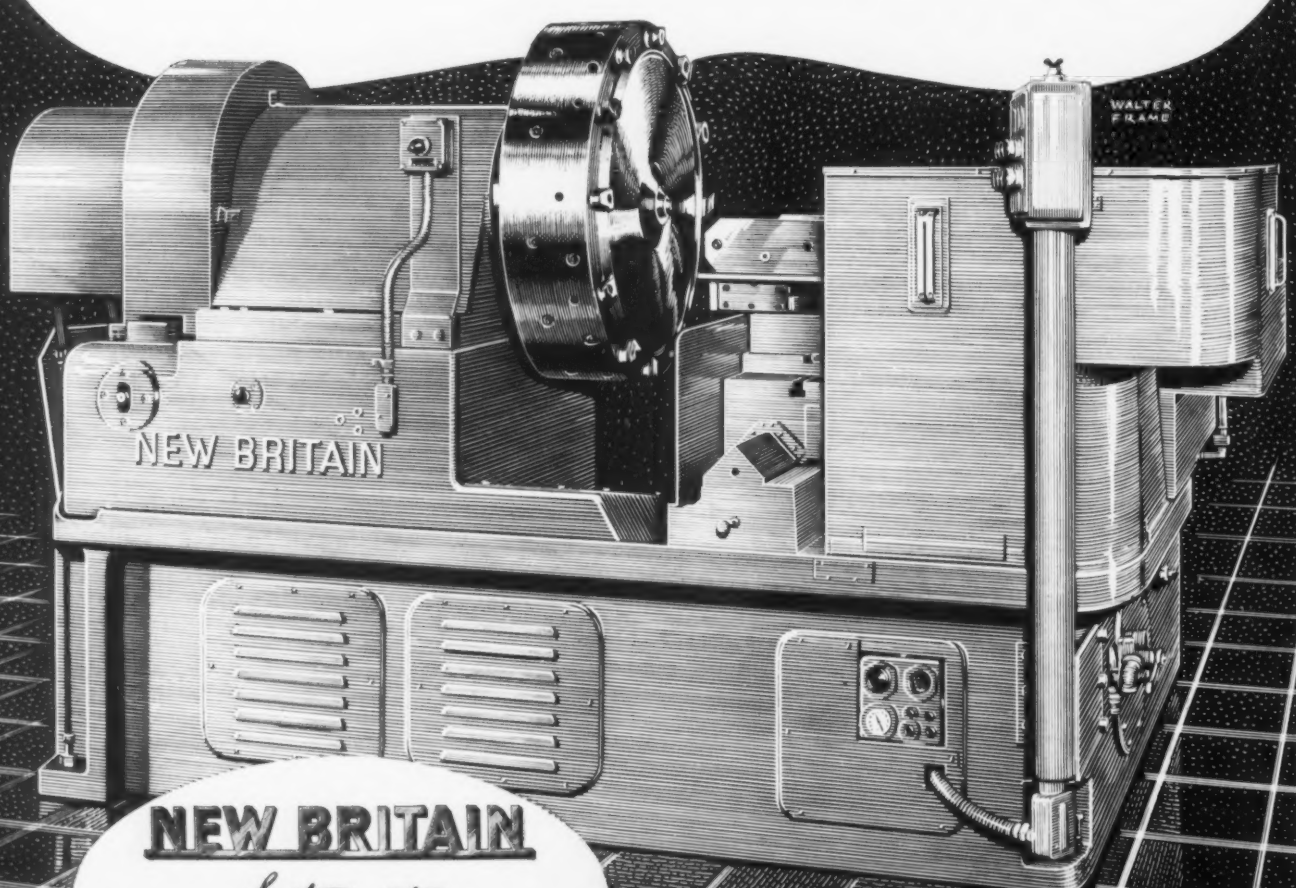

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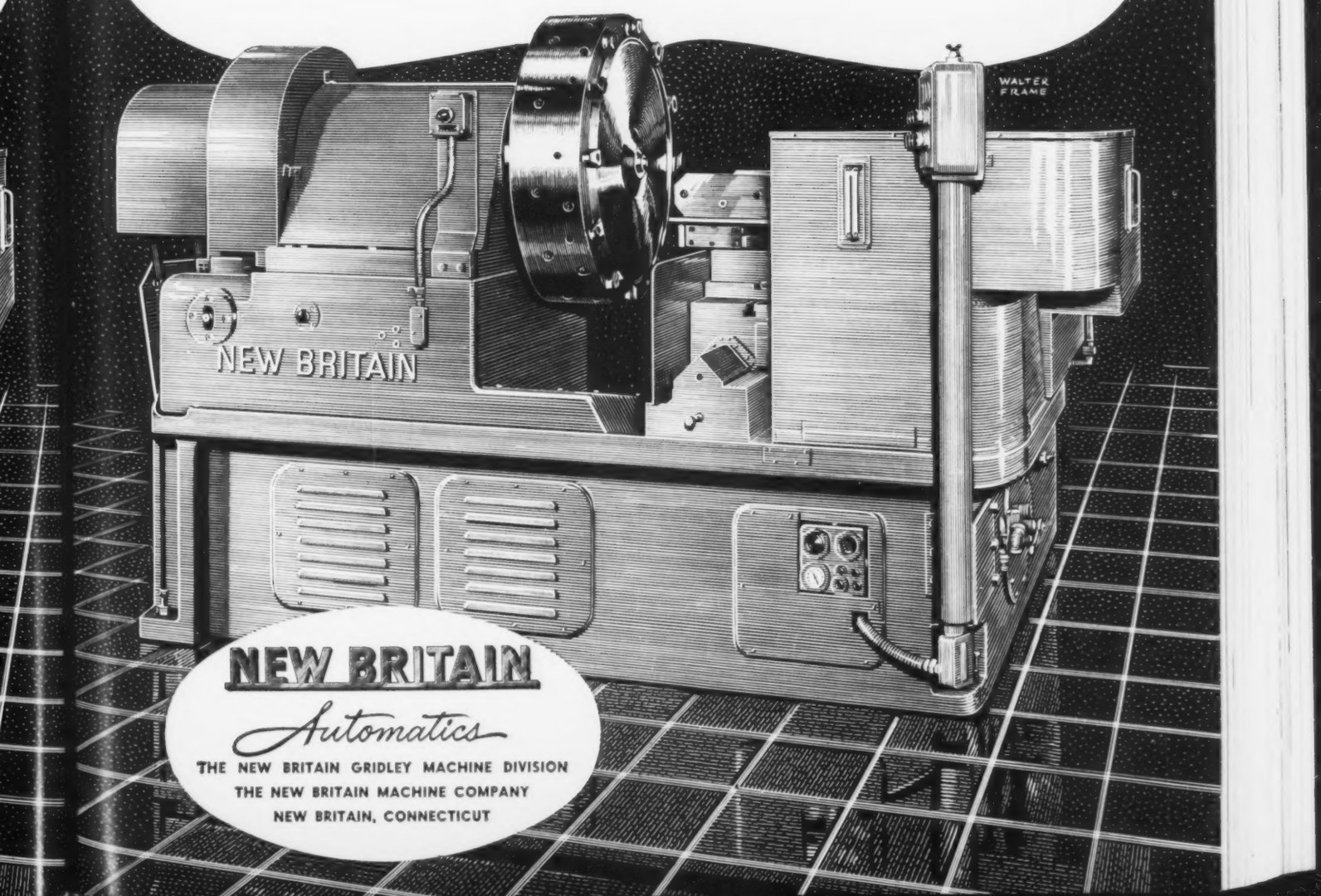

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Automatics

THE NEW BRITAIN GRIDLEY MACHINE DIVISION
THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT

The TOUGH Jobs are "Routine" on a KING

62" KING Vertical Boring & Turning Machine at Beloit Iron Works, Beloit, Wisc.

KING 50th ANNIVERSARY 1902-1952 VERTICAL BORING & TURNING MACHINES

"Tough" is the word for the job being machined here. But it's "all in the day's work" for this versatile 62" standard KING.

Just check over the things required in a boring mill to efficiently, economically machine this job. You need:

1. A ***speed range*** wide enough to turn the small diameter center post and still do turning and form tool work on the large outside diameter—both at efficient cutting speeds.
2. The ***right feed*** to provide acceptable surface finishes.
3. ***Hand controls*** sensitive enough to permit easy feeding of a large radius form tool.
4. ***Extra weight and rigidity*** that are necessary to provide chatter-free finishes.
5. ***Accuracy*** that will check out with a contour gauge.

Because KING mills have *all* of these advantages they meet *all* the requirements of this intricate job—just as they meet the boring, facing, and turning requirements of any other work, simple or complicated.

That's why, today as for half a century past, KING is industry's first choice for fast, accurate, profitable production. For full details see the King distributor in your locality, or write us direct.

King Vertical Boring & Turning Machines are made in 10 sizes —30", 36", 42", 52", 62", 72", 84", 100", 120", and 144".

American Steel Foundries

KING MACHINE TOOL DIVISION

CINCINNATI 29, OHIO